BLD23-7808

126 1st St W, Sonoma CA 95476

7/15/2024 10:34:09 AM

General Conditions

BUILDING PC REVIEW

stamps and attachments

CONTRACTOR SHALL NOT DEVIATE FROM THE APPROVED PLANS. REQUESTS FOR CHANGES SHALL BE MADE IN WRITING TO THE BUILDING DEPARTMENT. CHANGES MADE WITHOUT PRIOR APPROVAL SHALL BE SUBJECT TO REJECTION OF THE WORK.

WARNING: ACCESSIBLE ROUTES OF TRAVEL ARE REQUIRED TO ALL SITE FACILTIES AND ALL BUILDING ENTRACES. THSE PLANS MAY NEED REVISION TO COORDINATE WITH FUTURE IMPROVEMENTS.

Structural calculations are part of the approved plan set

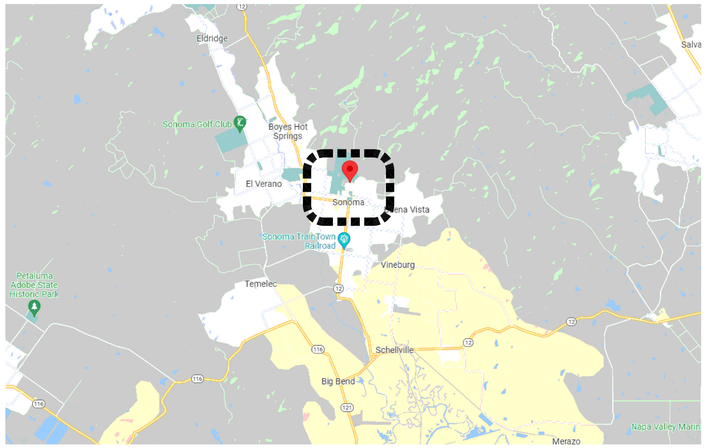
The Application for Unreasonable Hardship Determination for Accessibility Upgrades is part of the approved plan set

PROJECT NAME

CITY OF SONOMA, CALIFORNIA

SONOMA VETERANS MEMORIAL BUILDING: HVAC TENANT IMPROVEMENT

VICINITY MAPS



★APPROVED★
— AS NOTED —

PERMIT NO.	APPROVED BY
BLD23-7808	Paul Marquez

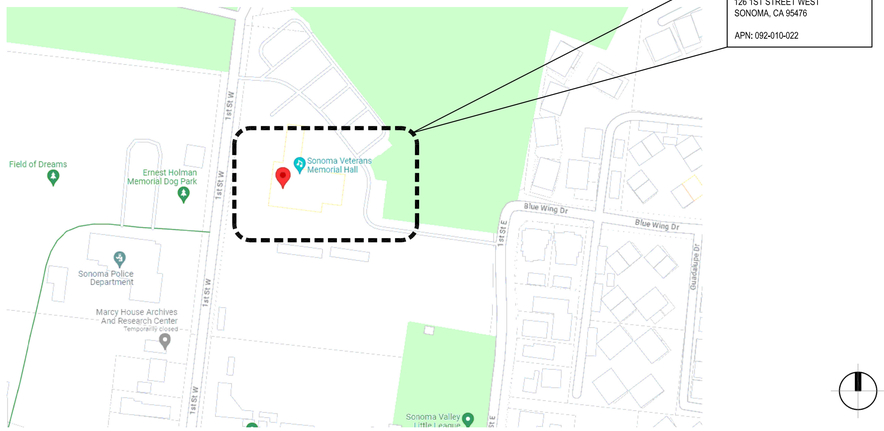
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

APPROVED JOB COPY OF PLANS TO BE PRINTED IN COLOR AND BE ON THE JOB SITE

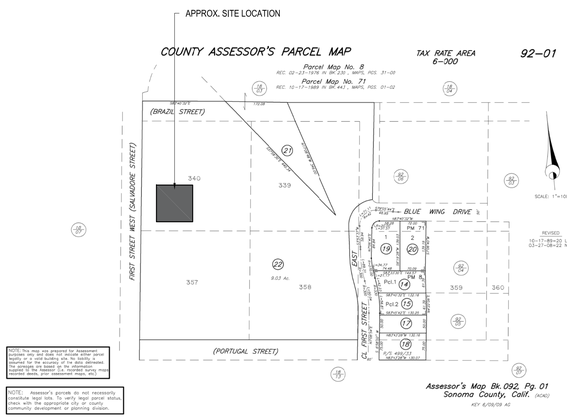
BUILDER SHALL NOT DEVIATE FROM THE APPROVED PLANS. REQUESTS FOR CHANGES SHALL BE MADE IN WRITING TO THE PERMIT AND RESOURCE MANAGEMENT DEPARTMENT. CHANGES MADE WITHOUT PRIOR APPROVAL SHALL BE SUBJECT TO REJECTION OF THE WORK.

APPROVAL OF THESE PLANS IS SUBJECT TO, AND DOES NOT AUTHORIZE DEVIATION FROM, COMPLETE COMPLIANCE WITH CODE REQUIREMENTS, SPECIAL INSPECTION WHEN REQUIRED, AND FIELD INSPECTION.

PLEASE READ ALL PERTINENT SECTIONS OF APPLICABLE CODES.



ASSESSOR'S PARCEL MAP



DEFERRED SUBMITTALS

ITEM(S) TO BE DEFERRED:

1. CONSTRUCTION DOCUMENTS TO CORRECT CROSS SLOPE IN EXCESS OF 2% ON ACCESSIBLE ROUTES FROM PARKING TO THE MAIN ENTRANCE.

APPLICABLE CODES/REFERENCES

CALIFORNIA BUILDING CODE - 2022 EDITION

1. CBC - CALIFORNIA BUILDING CODE
2. CMC - CALIFORNIA MECHANICAL CODE
3. CPC - CALIFORNIA PLUMBING CODE
4. CEC - CALIFORNIA ELECTRICAL CODE
5. CFC - CALIFORNIA FIRE CODE
6. CEnC - CALIFORNIA ENERGY COMMISSION
7. CGBS - CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN)

NATIONAL FIRE PROTECTION ASSOCIATION (PARTIAL LIST):

1. NFPA 70 - NATIONAL ELECTRIC CODE (2023 EDITION)

AMERICAN SOCIETY OF CIVIL ENGINEERS:

1. ASCE 7 - MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES

NOTE: PARTIAL LIST, REFER TO RESPECTIVE TRADE SHEETS FOR ALL APPLICABLE CODES

DOCUMENT LIST

CONTRACTOR SHALL REVIEW ENTIRE CONSTRUCTION SET, INCLUDING, BUT NOT LIMITED TO ALL SPECIFICATIONS, DRAWINGS, PROJECT MANUAL, CALCULATIONS AND CUT-SHEETS. ADDITIONAL LIST OF DOCUMENTS AND DRAWINGS CONTAINED HEREIN, INCLUDE;

GENERAL SITE & PROJECT INFORMATION:

G0.01	PROJECT COVER SHEET
G1.01	PROJECT SITE PLAN - GENERAL CONDITIONS

MECHANICAL:

M0.01	HVAC NOTES, LEGEND, SCHEDULES AND ABBREVIATIONS
M0.02	HVAC SPECIFICATIONS
M0.03	HVAC SPECIFICATIONS
M1.01	HVAC DEMOLITION PLAN - GROUND FLOOR
M1.02	HVAC DEMOLITION PLAN - ROOF
M1.03	HVAC PLAN - GROUND FLOOR
M1.04	HVAC PLAN - ROOF
M5.01	HVAC DETAILS
M7.01	TITLE-24 DOCUMENTATION
M7.02	TITLE-24 DOCUMENTATION

ELECTRICAL:

E-001	ELECTRICAL LEGEND AND ABBREVIATIONS
E-002	ELECTRICAL SPECIFICATIONS
E-101	ELECTRICAL ROOF DEMOLITION PLAN
E-113	ELECTRICAL ROOF PLAN
E-601	DIAGRAMS - SITE ELECTRICAL

STRUCTURAL:

S-001	STRUCTURAL GENERAL NOTES
S-002	CERTIFIED CURB INFORMATION
S-003	STATEMENT OF SPECIAL INSPECTIONS
S-101	PARTIAL ROOF PLAN
S-501	RT-1 SUPPORT DETAILS
S-502	RT-2 SUPPORT DETAILS
-	STRUCTURAL CALCULATIONS (SEPARATE DOCUMENT)

EQUIPMENT ANCHORAGE NOTES

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE APPROVED CONSTRUCTION DOCUMENTS, WHERE NO DETAIL IS INDICATED, THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2016 CBC, SECTIONS 1615A. 1.12 THROUGH 1.22 AND ASCE 7-10 CHAPTER 6 AND 13.

1. ALL PERMANENT EQUIPMENT AND COMPONENTS
2. TEMPORARY OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS, OR WATER.
3. MOVABLE EQUIPMENT WHICH IS STATIONED IN ONE PLACE FOR MORE THAN 8 HOURS AND HEAVIER THAN 400 POUNDS ARE REQUIRED TO BE ANCHORED WITH TEMPORARY ATTACHMENTS.

THE ATTACHMENT OF THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT BE DETAILED ON THE PLANS. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR HUNG FROM A WALL.

FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTES

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-10 SECTION 13.3 AS DEFINED IN ASCE 7-10 SECTION 13.6.8. 13.6.7, 13.6.5.6, AND 2019 CBC, SECTION 1616.

THE BRACING ATTACHMENTS TO THE STRUCTURE SHALL BE DETAILED ON THE APPROVED DRAWINGS OR THEY SHALL COMPLY WITH ONE OF THE PRE-APPROVALS (OPA #) AS MODIFIED TO SATISFY ANCHORAGE REQUIREMENTS OF ACI 318, APPENDIX D.

COPIES OF THE MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF HANGING AND BRACING OF THE PIPE, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS.

THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

PROJECT TEAM

OWNER/CLIENT:

COMPANY: COUNTY OF SONOMA
ADDRESS: 23000 COUNTY CENTER DRIVE, SUITE A220 SANTA ROSA, CA 95403
PHONE: 707.565.1366
EMAIL: MARK.ABEL@SONOMA-COUNTY.ORG
CONTACT: MARK ABEL, CASP | SENIOR PROJECT SPECIALIST

ELECTRICAL ENGINEER:

COMPANY: BROKAW DESIGN
ADDRESS: 6060 DAWN DRIVE ROHNERT PARK, CA 94928
PHONE: 707.799.6822
EMAIL: COURTNEY.CHUENYANE@BROKAWDESIGN.COM
CONTACT: COURTNEY CHUENYANE, PE LEED

STRUCTURAL ENGINEER:

COMPANY: BROKAW DESIGN
ADDRESS: 6060 DAWN DRIVE ROHNERT PARK, CA 94928
PHONE: 415.999.0323
EMAIL: TIM.LENGYEL@BROKAWDESIGN.COM
CONTACT: TIM LENGYEL, PE, SE

MECHANICAL ENGINEER:

COMPANY: 15000 INC.
ADDRESS: 6085 STATE FARM DRIVE #130 ROHNERT PARK, CA 94928
PHONE: 707.577.0363
EMAIL: MATT@15000INC.COM
CONTACT: MATTHEW TORRE, PE ROBERT YOUNGER

PROJECT OVERSIGHT:

COMPANY: 15000 INC.
ADDRESS: 6085 STATE FARM DRIVE #130 ROHNERT PARK, CA 94928
PHONE: 707.577.0363
EMAIL: MATT@15000INC.COM
CONTACT: MATTHEW TORRE, PE

SCOPE OF WORK

PROVIDE MECHANICAL, ELECTRICAL, PLUMBING AND STRUCTURAL ENGINEERING TO SUPPORT THE REMOVAL OF TWO (2) GAS HEATING ONLY ROOFTOP UNITS WITH THE REPLACEMENT OF TWO (2) PACKAGED HEAT PUMP UNITS, AS WELL AS THE REPLACEMENT OF THREE (1) ROOFTOP EXHAUST FANS AND ONE (1) CEILING EXHAUST FAN. DESIGN SHALL INCORPORATE STRUCTURAL MODIFICATIONS TO SUPPORT THE NEW UNITS. PROVIDE NEW ROOFTOP DUCT LAYOUT DESIGN TO REPLACE EXISTING.

THE STRUCTURAL MODIFICATIONS WILL REQUIRE PORTIONS OF THE EXISTING ROOF TO BE PATCHED AND/OR REROOFED. THE BASIS OF DESIGN FOR THE ROOF PATCHING IS MATCH THE EXISTING CONDITIONS: GAF ROOF SYSTEM (SEE BELOW FOR ADDITIONAL INFORMATION).

GAF

Sonoma Veterans Memorial Hall, 126 1st St W, Sonoma, CA 95476
SPECIFICATION: PFATI80

COMPONENT	*TYPE*	*REQUIRED*	*ATTACHMENT*	*RATE OF APPLICATION*
DECK	**Wood plank**	1"	Per Code	N/A
INSULATION 1	**Dens Deck® Prime Roof Board**, 900 psi ASTM C1177 Size: 1/2", 4' x 8' LTTR: 0.56	**1** layer	Fastened with: Drill-Tec™ XHD (#15) Fastener Drill-Tec™ 3 in. Ribbed Galvalume Flate (Flat)	1 fastener per 2 sq. ft.: Field: 16 fasteners per 4' x 8' board Perimeter: 24 fasteners per 4' x 8' board Corner: 32 fasteners per 4' x 8' board
SINGLE PLY MEMBRANE	**EverGuard® PVC Smooth** 80 mil White ASTM D4434 Size: 10ft	**1** ply	Adhered with: EverGuard® #2331 Bonding Adhesive	50-60 sq ft of installed membrane per gallon. Adhesive is applied to both substrate surface and the underside of the membrane
FLASHING MEMBRANE	**EverGuard® PVC Smooth** 80 mil White ASTM D4434	**1** ply	Adhered with: EverGuard® #2331 Bonding Adhesive	50-60 sq ft of installed membrane per gallon. Adhesive is applied to both substrate surface and the underside of the membrane. Maximum flashing height is 54". A separate counterflashing is required for guarantees over 20 years.
GUARANTEE	**EverGuard® Diamond Pledge™ NDL Roof Guarantee**	25 years		Guarantee fee applicable

15000 INC.
heating, ventilation, air conditioning + plumbing design and engineering
6085 STATE FARM DR, #130 ROHNERT PARK, CA 94928
phone: 707.577.0363
fax: 707.577.0364

REGISTERED PROFESSIONAL ENGINEER — MATTHEW J. TORRE — M 36958 — Exp 9/30/25 — MECHANICAL — STATE OF CALIFORNIA

SIGNED 5-20-2024

CLIENT

County of Sonoma
2300 County Center Drive, Suite A220
Santa Rosa, CA 95403

PROJECT TITLE

Sonoma Veteran's Memorial Hall HVAC Tenant Improvement

126 1st Street West
Sonoma, CA 95476

APPROVALS

#	REVISION	DATE
1	PLAN CHECK RESPONSE	05/21/2024

DRAWING TITLE

PROJECT INFORMATION

ISSUE DATE	10/23/2023
ISSUE TYPE	OWNER REVIEW
DRAWN BY	RLY
CHECKED BY	MJT/JMT
SCALE	AS NOTED
PROJECT No.	1817.0.00

DRAWING

G0.01

Date Stamped: 7/9/2024 Permit #: BLD23-7808 Plans Examiner: Paul Marquez
REVIEWED FOR CODE COMPLIANCE - PERMIT SONOMA - BUILDING PLAN CHECK
APPROVED PLANS AND DOCUMENTS TO BE AVAILABLE ON THE JOB SITE
BUILDER SHALL NOT DEVIATE FROM THE APPROVED PLANS. REQUESTS FOR CHANGES SHALL BE MADE IN WRITING TO PERMIT SONOMA. CHANGES MADE WITHOUT PRIOR APPROVAL SHALL BE SUBJECT TO REJECTION OF THE WORK.
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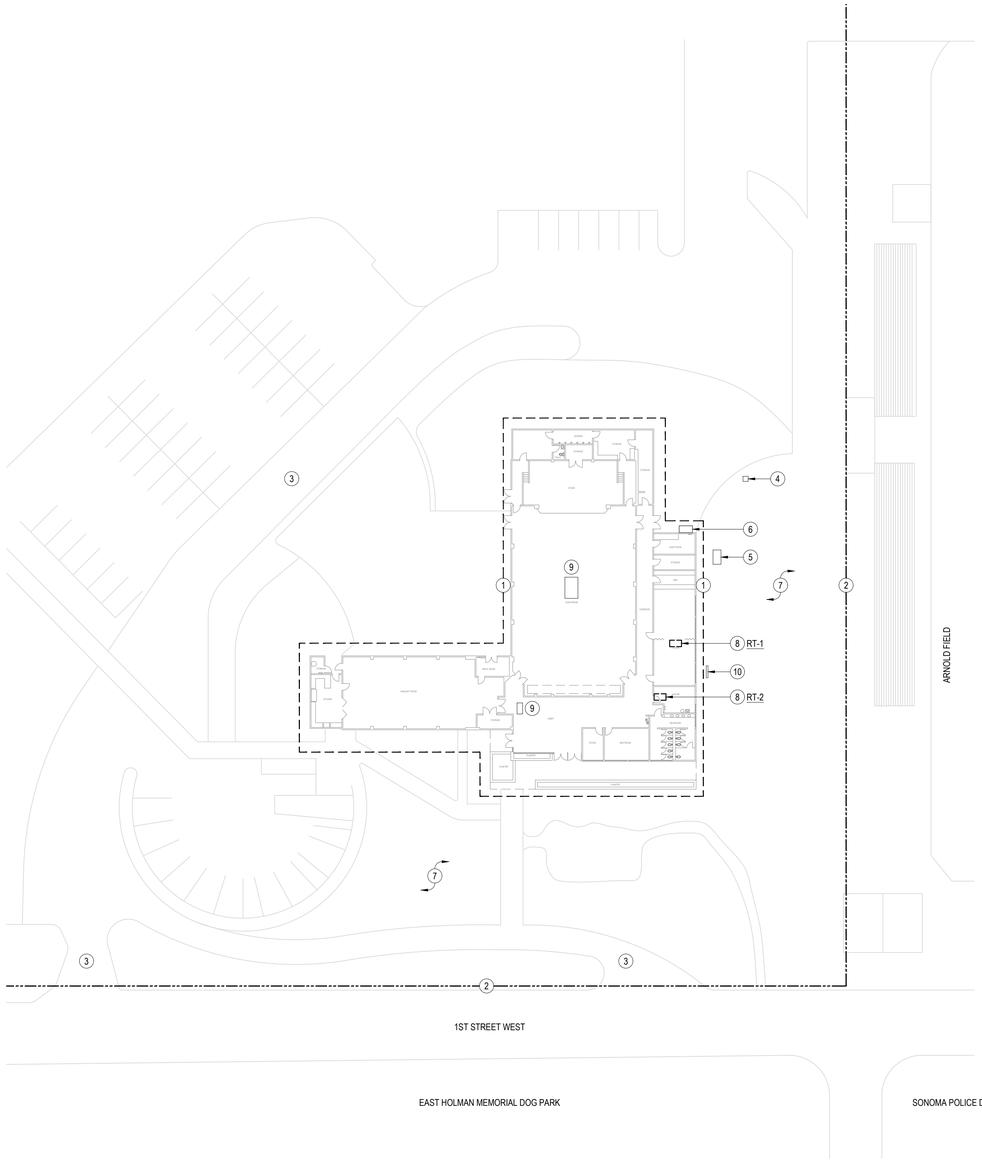

1 PROJECT SITE PLAN - GENERAL CONDITIONS

SCALE: 1/32"=1'-0"

NORTH

GENERAL SHEET NOTES

A. ANY EXISTING PROPERTY LINES, SITE FEATURES, SUBGRADE UTILITIES AND INFRASTRUCTURE ARE FOR REFERENCE ONLY AND IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO SITE VERIFY CONDITIONS AND REPORT BACK TO DESIGN TEAM IF DISCREPANCIES BETWEEN PLANS AND ACTUAL SITE CONDITIONS VARY.

B. CALL UNDERGROUND SERVICE ALERT (USA) 1-800-227-2600 TO HAVE THEM LOCATE AND MARK EXISTING UNDERGROUND UTILITY LINES IN DRIVEWAY PRIOR TO CONSTRUCTION.

C. ANY DIMENSIONAL INFORMATION SHOWN IS FOR REFERENCE ONLY AND SHALL BE FIELD VERIFIED PRIOR TO CONSTRUCTION.

SITE SHEET NOTES

1. EXISTING STRUCTURE TO REMAIN, SHOWN FOR REFERENCE ONLY.
2. APPROXIMATE PROPERTY LINE, VERIFY WITH COUNTY ASSESSOR'S MAP (APN: 092-010-022). REFER TO G0.01 FOR MAP.
3. EXISTING DRIVEWAY/DRIVE AISLE.
4. EXISTING TRANSFORMER, FOR REFERENCE ONLY.
5. EXISTING SWITCHGEAR, FOR REFERENCE ONLY. REFER TO ELECTRICAL SHEETS FOR FURTHER INFORMATION.
6. EXISTING GENERATOR AND TANK, FOR REFERENCE ONLY.
7. EXISTING LANDSCAPE AREA.
8. EXISTING HEATING ONLY ROOFTOP UNIT - REFER TO MECHANICAL SHEETS FOR DEMOLITION OF EQUIPMENT AND SPECIFICATION FOR REPLACEMENT HEAT PUMP UNIT. REFER TO STRUCTURAL AND ELECTRICAL PLANS FOR SUPPORTING WORK RELATED TO HVAC EQUIPMENT REPLACEMENT.
9. EXISTING HVAC UNIT TO REMAIN FOR REUSE (NO WORK, SHOWN FOR REFERENCE ONLY).
10. EXISTING PG&E GAS METER, SHOWN FOR PROXIMITY REFERENCE ONLY.

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ROHNERT PARK, CA 94928 fax: 707.577.0364

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. TORRE
M 36958
Exp 9/30/24
MECHANICAL
STATE OF CALIFORNIA

SIGNED 5-20-2024

CLIENT

County of Sonoma
2300 County Center Drive, Suite A220
Santa Rosa, CA 95403

PROJECT TITLE

Sonoma Veteran's Memorial Hall HVAC Tenant Improvement

126 1st Street West
Sonoma, CA 95476

APPROVALS

#	REVISION	DATE
1	PLAN CHECK RESPONSE	05/21/2024

DRAWING TITLE

PROJECT SITE PLAN - GENERAL CONDITIONS

ISSUE DATE	10/23/2023
ISSUE TYPE	OWNER REVIEW
DRAWN BY	RLY
CHECKED BY	MJT/JMT
SCALE	AS NOTED
PROJECT No.	1817.0.00

DRAWING

G1.01

TIMECLOCK SPECIFICATION

PROVIDE (1) INTERMATIC ET2745C 7-DAY 4-CIRCUIT ELECTRONIC TIMECLOCK, 120VAC, BATTERY BACKUP, INDOOR ENCLOSURE.

INTERLOCK EXHAUST FANS EF-1 THRU EF-4 TO TIMECLOCK.

FAN ACTIVATION SHALL COINCIDE WITH THE BUILDING OCCUPIED SCHEDULE, COORDINATE OCCUPANCY SCHEDULING WITH OWNER PRIOR TO INSTALLATION.

GWP REFRIGERANT NOTE (2024)

EQUIPMENT TYPE (GENERAL END USE)	EQUIPMENT TYPE (SPECIFIC END USE)	PROHIBITED SUBSTANCES	EFFECTIVE DATE	EQUIPMENT IN PROJECT
NEW AIR-CONDITIONING EQUIPMENT, STATIONARY	ROOM/WALL/WINDOW AIR-CONDITIONING EQUIPMENT, PTACs, PTHPs, PORTABLE AIR CONDITIONING EQUIPMENT, AND RESIDENTIAL DEHUMIDIFIERS	REFRIGERANTS WITH A GWP OF 750 OR GREATER	PROHIBITED AS OF: JANUARY 1, 2023	NO
NEW AIR-CONDITIONING EQUIPMENT, STATIONARY	OTHER AIR-CONDITIONING (NEW) EQUIPMENT, RESIDENTIAL AND NON-RESIDENTIAL	REFRIGERANTS WITH A GWP OF 750 OR GREATER	PROHIBITED AS OF: JANUARY 1, 2025	YES
NEW AIR-CONDITIONING EQUIPMENT, STATIONARY	VARIABLE REFRIGERANT FLOW (VRV) SYSTEM, VARIABLE REFRIGERANT VOLUME (VRV) SYSTEM (NEW)	REFRIGERANTS WITH A GWP OF 750 OR GREATER	PROHIBITED AS OF: JANUARY 1, 2026	NO

REMARKS:

1. THE PROVISIONS LISTEN WITHIN THE TABLE ARE IN REFERENCE TO CALIFORNIA CODE OF REGULATIONS, TITLE 17, DIVISION 3, CHAPTER, 1 SUBCHAPTER 10 CLIMATE CHANGE, ARTICLE 4, AND ARE NOT EXHAUSTIVE.
2. THE GWP OF R410A IS APPROXIMATELY 2,088 AND IS THE CURRENT BASIS OF DESIGN FOR THIS PROJECT.
3. EQUIPMENT UTILIZING REFRIGERANTS EXCEEDING THE GWP USED FOR INSTALLATION AFTER THE ASSOCIATED EFFECTIVE DATE MUST HAVE A DATE OF MANUFACTURER LISTED ON THE EQUIPMENT NAMEPLATE DATA DEMONSTRATING THE EQUIPMENT WAS MANUFACTURED PRIOR TO THE EXPIRATION OF THE EFFECTIVE DATE.
4. EQUIPMENT WITH A DATE OF MANUFACTURER AFTER THE EFFECTIVE DATE LISTED ABOVE MUST UTILIZE LOW GWP REFRIGERANTS SUCH AS R-32, R-454B, ETC. AS OUTLINED BY THE CALIFORNIA AIR RESOURCE BOARD (CARB).
5. EQUIPMENT UTILIZING NEW LOW GWP REFRIGERANTS MAY HAVE GREATER WEIGHT, GREATER POWER DRAW, AND/OR DIFFER CHASSIS SIZE. THE CURRENT SET OF PLANS IS BASED UPON R-410A, AND IT IS THE REQUIREMENT OF THE CONTRACTOR TO COORDINATE THE ABOVE PARAMETERS SHOULD THERE BE A DELAY IN EQUIPMENT PROCUREMENT WHICH FORCES A CHANGE IN REFRIGERANT TYPE.
6. PLANS AND SPECIFICATIONS ARE NOT VALID FOR CONSTRUCTION AFTER 1/1/2025 IF >750 GWP REFRIGERANTS ARE UTILIZED FOR CONVENTIONAL HVAC EQUIPMENT (1/1/2026 FOR VRF/VRV EQUIPMENT).

HVAC LEGEND

DUCT, ROUND OR RECTANGULAR (AS NOTED PER PLANS)
DUCT, ROUND OR RECTANGULAR (AS NOTED PER PLANS)
DUCT BREAK (ROUND/RECT)
VOLUME DAMPER
DUCT, INTERNALLY INSULATED (ROUND OR RECTANGULAR)
FLEXIBLE DUCT/EQUIPMENT CONNECTION
TURNING VANES IN RECTANGULAR DUCTWORK
A / CFM + — AIR OUTLET/INLET CALL-OUT TYPE / FLOW (PRESSURE)
DUCTWORK CROSS SECTION
ARROWS INDICATE BLOW PATTERN — SUPPLY DIFFUSER OUTLET (CEILING)
RETURN GRILLE INLET (CEILING)
EXHAUST GRILLE INLET (CEILING)
DUCT DROP
DUCT RISE (TO PLAN LEVEL ABOVE)
T — THERMOSTAT @ 48" AFF
H S CO — HUMIDISTAT, CO2 SENSOR, CO SENSOR @ MFG REC. HEIGHT.
DT / DWG — DETAIL REFERENCE 1 / M2.1 — DETAIL NUMBER, SHEET NUMBER
EQ / # — EQUIPMENT TAG AC / 1 — EQUIPMENT TAG, EQUIPMENT #
FSD — FIRE/SMOKE DAMPER
M — LOW LEAKAGE OPPOSED BLADE MOTORIZED DAMPER
POINT OF CONNECTION
SD — DUCT SMOKE DETECTOR

HVAC LEGEND, CONT.

PIPE DROP
PIPE RISE
INLINE PIPE DROP
INLINE PIPE RISE
PIPE BREAK
GATE VALVE
BALL VALVE
MANUAL BALANCING VALVE
WYE STRAINER (WITH DRAIN VALVE)
CHECK VALVE
UNION
THERMOMETER
PRESSURE GAUGE
PT — PRESSURE/TEMPERATURE PORT
MOTORIZED 2-WAY CONTROL VALVE
AB A B — MOTORIZED 3-WAY CONTROL VALVE (DIVERTING OR MIXING)
PRESSURE/TEMPERATURE RELIEF VALVE
CAP INSTALLED ON (E) PIPE
2% — DIRECTION OF PITCH IN PIPING, AT % GRADE

LOCAL AIR OUTLET SCHEDULE

X / 0000 + (TYPE, CFM, PRESSURE)	MANUFACTURER MODEL #	TYPE	NOTES	REMARKS
S / - +	PRICE SMDA	SUPPLY	STEEL, 4-WAY BLOW	1, 2, 3, 4
R / - +	PRICE 630	RETURN	ALUMINUM, 3/4" BLADE SPACING	1, 2, 3, 4, 5
E / - +	TITUS 630	EXHAUST	ALUMINUM, 3/4" BLADE SPACING	1, 2, 3, 4, 5

X / 0000 +	6"Ø ⟶ (0-90 CFM)	8"Ø ⟶ (91-200 CFM)	10"Ø ⟶ (201-380 CFM)	12"Ø ⟶ (381-600 CFM)	14"Ø ⟶ (601-900 CFM)
X / 0000 +	16"Ø ⟶ (901-1250 CFM)	18"Ø ⟶ (1251-1800 CFM)	20"Ø ⟶ (1801-2400 CFM)	22"Ø ⟶ (2401-3000 CFM)	24"Ø ⟶ (3001-3750 CFM)

REMARKS:

1. REFER TO CHART IMMEDIATELY ABOVE FOR BRANCH SIZING.
2. SECURE DAMPER TO REDUCE VIBRATION.
3. ALL OUTLETS TO BE PROVIDED WITH INSULATED SHEET METAL CAN (FULL SIZE) ON TOP OF OUTLET (1/2" INSULATION).
4. SUBMIT COLOR PALETTE TO ARCHITECT/OWNER. OPPOSED BLADE BALANCING DAMPER, ADJUSTABLE THROUGH FACE OF GRILLE.

ABBREVIATIONS

NOT ALL ABBREVIATIONS LISTED HEREIN APPEAR ON THE DRAWINGS.

(N)	NEW
(E)	EXISTING
AD	ACCESS DOOR
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AL	ACOUSTICALLY LINED
ALM	ALUMINUM
AP	ACCESS PANEL
APSI	ABSOLUTE PRESSURE
ATR	ALL THREAD ROD
BDD	BACKDRAFT DAMPER
BF	BELOW FLOOR
BG	BELOW GRADE
BHP	BRAKE HORSEPOWER
BLKG	BLOCKING
BO	BY OTHERS
BTU	BRITISH THERMAL UNITS
BTUH	BRITISH THERMAL UNITS PER HOUR
BV	BALL VALVE
CD	CONDENSATE DRAIN PIPING
CFF	CAPPED FOR FUTURE
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CK	CHECK VALVE
COTG	CLEANOUT TO GRADE
CTE	CONNECT TO EXISTING
CV	CONSTANT VOLUME
CW	DOMESTIC COLD WATER
CWV	COMBINATION WASTE & VENT
DB	DRY BULB TEMPERATURE
DH	DUCT HEATER
DIA	DIAMETER
DN	DOWN
DWV	DRAIN, WASTE, AND VENT
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ECM	ELECTRONIC COMMUTATED MOTOR
EDH	ELECTRIC DUCT HEATER
EFF	EFFICIENCY
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
F	DEGREES FAHRENHEIT
FBO	FURNISHED BY OTHERS
FC	FLEXIBLE CONNECTION
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FD	FIRE DAMPER
FLA	FULL LOAD AMPERES
FS	FLOOR SINK
FSD	COMBINATION FIRE/SMOKE DAMPER
FPM	FEET PER MINUTE
FT	FEET
FT2	SQUARE FEET
G	GAS PIPING
GC	GAS COCK
GC	GENERAL CONTRACTOR
GPF	GALLONS PER FLUSH
GPM	GALLONS PER MINUTE
GSMS	GALVANIZED SHEET METAL SCREW
GV	GATE VALVE
GW	GREASE WASTE
HB	HOSE BIBB
HHWR	HEATING HOT WATER RETURN
HR	HEAT RECOVERY
HWS	HEATING HOT WATER SUPPLY
HP	HORSEPOWER
HW	DOMESTIC HOT WATER
HX	HEAT EXCHANGER
IFC	IN FURRED CEILING
IN	INCH
INS	INCHES
INS	INSULATION
IS	IN SOFFIT
IS.	ISSUE.
IW	INDIRECT WASTE
K	KILOGRAMS
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LWT	LEAVING WATER TEMPERATURE
MAT	MIXED AIR TEMPERATURE
MAX	MAXIMUM
MBH	BTUH, THOUSANDS
MCA	MINIMUM CIRCUIT AMPERES
MFR	MANUFACTURER
MIN	MINIMUM
MOCP	MAXIMUM OVERCURRENT PROTECTION
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OC	ON CENTER
OD	OVERFLOW DRAIN
OP	OWNER PROVIDED
PH	PRE-HEAT
POC	POINT OF CONNECTION
PRTV	PRESSURE/TEMPERATURE RELIEF VALVE
PRV	PRESSURE RELIEF VALVE
PSI	GAUGE PRESSURE (POUNDS PER SQUARE INCH)
PTDF	PRESSURE TREATED DOUGLAS FIR
RA	RETURN AIR
RD	ROOF DRAIN
RVD	RELIEF VALVE DISCHARGE
RL	REFRIGERANT LIQUID PIPING
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION PIPING
RWL	RAINWATER LEADER
S	SENSOR
SA	SHOCK ABSORBER
SA	SUPPLY AIR
SAD	SEE ARCHITECTURAL DRAWINGS
SCD	SEE CIVIL DRAWINGS
SD	STORM DRAIN
SD	SMOKE DETECTOR
SED	SEE ELECTRICAL DRAWINGS
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SHGF	SOLAR HEAT GAIN FACTOR
SHR	SENSIBLE HEAT RATIO
SMD	SEE MECHANICAL DRAWINGS
SMS	SHEET METAL SCREW
SOV	SHUT OFF VALVE
SP	SPRINKLER
SP	STATIC PRESSURE
SPD	SEE PLUMBING DRAWINGS
SQFT	SQUARE FEET
SS	SANITARY SEWER
SSD	SEE STRUCTURAL DRAWINGS
T	THERMOSTAT
TH	THERMOMETER
TPV	TRAP PRIMER VALVE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
U	UNION
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
V	VENT PIPING
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VIF	VERIFY IN FIELD
V/P/H	VOLTS/PHASE/HERTZ
VSD	VARIABLE SPEED DRIVE
VTR	VENT THROUGH ROOF
W/	WITH
W/O	WITHOUT
WA	WATER HAMMER ARRESTOR
WB	WET BULB TEMPERATURE
WC	WATER COLUMN
WCO	WALL CLEANOUT
WT	WEIGHT

PACKAGED HEAT PUMP ROOFTOP UNIT SCHEDULE

TYPE #	MANUFACTURER MODEL #	SERVICE	S/A CFM	O/A CFM	DCV CFM	E.S.P. IN.W.C.	BHP	ECONOMISER	PWD EXH	EER	IEER	COP47	COP17	COOLING (MBH) TC	COOLING (MBH) SC	HEAT* MBH	ELEC. HEAT KW	ELEC. HEAT MBH	ELECTRICAL DATA V/Ø/H	ELECTRICAL DATA MCA	ELECTRICAL DATA MOCP	WEIGHT LBS	REMARKS
RT 1	CARRIER 50FCQM07	LOUNGE	2400	630	250	0.8"	1.46	YES	NO	11.2	15.0	3.6	2.4	70	55	65	7.9	26.5	208/3/60	57	60	825	SEE BELOW
RT 2	CARRIER 50FCQM07	LOBBY	2400	630	N/A	0.8"	1.46	YES	NO	11.2	15.0	3.6	2.4	70	55	65	7.9	26.5	208/3/60	57	60	825	SEE BELOW

REMARKS:

*RATED AT 47°F DB AMBIENT

1. HORIZONTAL DISCHARGE / RETURN DUCT CONNECTIONS
2. HINGED ACCESS DOORS
3. THROUGH-THE-BASE ELECTRICAL CONNECTIONS
4. 7-DAY PROGRAMMABLE THERMOSTAT
5. SUPPLY/RETURN DUCT SMOKE DETECTOR
6. PHASE MONITOR ACCESSORY
7. COMPRESSOR DELAY CONTROL CIRCUIT
8. DRY BULB ECONOMIZER, BAROMETRIC RELIEF
9. MICROMETL ECH-SRT12CB ECONOMIZER WITH ULTRA LOW LEAK DAMPERS AND HONEYWELL JADE W7220 ELECTROMECHANICAL CONTROLLER WITH ECONOMISER FAULT DETECTION AND DIAGNOSTICS
10. R410A SCROLL COMPRESSOR, 2 STAGE COOLING
11. SINGLE POINT POWER CONNECTION KIT
12. ELECTRIC RESISTANCE HEATER
13. UNPOWERED CONVENIENCE OUTLET
14. DISCONNECT, S.E.D. FOR ALL ADDITIONAL INFORMATION.
15. PROVIDE MERV 13 FILTERS
16. 14" INSULATED CURB
17. MEDIUM STATIC BELT MOTOR
18. [RT-1 ONLY]: PROVIDE DEMAND CONTROL VENTILATION SEQUENCING. SET MINIMUM OCCUPIED MODE VENTILATION REQUIRED BY DCV SEQUENCE TO SCHEDULED VALUE. PROVIDE WALL-MOUNTED CO2 SENSOR
19. [RT-1 ONLY]: SINGLE ZONE VAV FAN SPEED CONTROL
20. MICROMETL CRBW-SRT12HA-1411 WELDED STRUCTURALLY CALCULATED CURB.

EXTERIOR DUCT SPECIFICATION

ROOF-MOUNTED EXTERIOR DUCTWORK TO BE CONSTRUCTED OF PREFABRICATED PHENOLIC DUCTWORK WITH UV-STABLE VINYL CLADDING AND MINIMUM R-8 INSULATION. BASIS OF DESIGN THERMADUCT.

CONTRACTOR TO VISIT SITE AND PROVIDE FIELD MEASUREMENTS OF PROPOSED DUCT ROUTING, TO BE PROVIDED TO PREFABRICATED DUCT MANUFACTURER FOR SPOOLING. PROVIDE SHOP DRAWINGS DETAILING ROUTING OF EXTERIOR DUCTWORK AND ASSOCIATED ROOF-MOUNTED SUPPORTS (BOTH EXISTING SUPPORT RAILS AND NEW). SPECIFY WHICH DUCT SECTIONS ARE PRE-FABRICATED VERSUS SITE-ASSEMBLED. SPECIFY WHICH DUCT SECTIONS EXCEED 20 LB / FT AND NOTIFY MEOR AND SEOR.

REFER TO M0.03 PART 233116 - PHENOLIC DUCTS SPECIFICATION FOR ADDITIONAL INFORMATION.

EXHAUST FAN SCHEDULE

TAG #	MANUFACTURER MODEL #	CFM	ESP (IN. WC)	RPM	WATTS	HP	BHP	SONES	VOLTS-Ø-Hz	WEIGHT (LBS)	REMARKS
EF 1	GREENHECK G-090-VG	630	0.25	-	-	1/10	0.06	0.7	120/1/60	30	1,2,3,4,8
EF 2	GREENHECK G-090-VG	630	0.25	-	-	1/10	0.06	0.7	120/1/60	30	1,2,3,4,8
EF 3	GREENHECK CSP-A390	250	0.25	-	55	-	-	1.1	120/1/60	26	1,5,6,7,8

REMARKS:

1. UL 507 LISTED
2. SOLID STATE SPEED CONTROL, MOUNTED TO FAN
3. ROOF CURB - 14" HIGH
4. NEMA-1 DISCONNECT SWITCH UNDER DOME OF FAN
5. PLUG DISCONNECT SWITCH
6. GREENHECK WC-8 WALL CAP
7. VIBRATION ISOLATION KIT
8. INTERLOCK FAN OPERATION WITH TIMECLOCK, REFER TO TIMECLOCK SPECIFICATION.

CALGREEN NOTES

1. HVAC SYSTEM INSTALLERS SHALL BE TRAINED AND CERTIFIED IN THE PROPER INSTALLATION OF HVAC SYSTEMS.
2. PROVIDE DOCUMENTATION TO SHOW COMPLIANCE WITH CONSTRUCTION DOCUMENTS, PLANS, INSTALLER CERTIFICATIONS, INSPECTION REPORTS, TO DEMONSTRATE SUBSTANTIAL CONFORMANCE. WHEN SPECIFIC DOCUMENTATION OR SPECIAL INSPECTION IS NECESSARY TO VERIFY COMPLIANCE, THAT METHOD OF COMPLIANCE WILL BE SPECIFIED IN THE APPROPRIATE SECTION OR IDENTIFIED IN THE APPLICATION CHECKLIST
3. AABC COMPLIANCE: COMPLY WITH AABC'S MANUAL MN_1 "AABC NATIONAL STANDARDS", AS APPLICABLE TO MECHANICAL AIR DISTRIBUTION SYSTEMS AND ASSOCIATED EQUIPMENT AND APPARATUS, EXCEPT AS OTHERWISE SPECIFIED. DEVELOP A WRITTEN PLAN OF PROCEDURES TO BE INCLUDED FOR TESTING AND BALANCING. SUBMIT CERTIFIED TEST REPORTS SIGNED BY THE TEST AND BALANCE SUPERVISOR WHO PERFORMED TESTING AND BALANCING WORK. PROVIDE A COPY OF THE FINAL TEST REPORT TO THE ENFORCING AGENCY.
4. PROVIDE VENTILATION DURING CONSTRUCTION THRU OPENINGS IN THE BUILDING SHELL USING TEMPORARY FANS TO PRODUCE A MINIMUM OF 3 AIR CHANGES PER HOUR. DO NOT USE THE PERMANENT HVAC EQUIPMENT FOR THIS PURPOSE.
5. COVER ALL DUCT OPENINGS WITH SHEET METAL OR PLASTIC DURING CONSTRUCTION TO REDUCE DUST AND DEBRIS IN DUCTWORK.
6. ALL AIR FILTERS SHALL BE MINIMUM MERV 13. A HIGHER MERV RATING MAY BE REQUIRED ON SCHEDULES OR SPECIFICATIONS.
7. NO HVAC REFRIGERANT SYSTEMS USING HYDROCHLOROFLUOROCARBONS SHALL BE USED ON THE PROJECT.
8. PROVIDE THE BUILDING OWNER WITH DETAILED OPERATION AND MAINTENANCE INSTRUCTIONS AND COPIES OF GUARANTEES/WARRANTIES FOR EACH SYSTEM PRIOR TO FINAL INSPECTION.

END.

EQUIPMENT ANCHORAGE NOTES

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE APPROVED CONSTRUCTION DOCUMENTS. WHERE NO DETAIL IS INDICATED, THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2019 CBC, SECTIONS 1615. 1.12 THROUGH 1.22 AND ASCE 7-10 CHAPTER 6 AND 13.

1. ALL PERMANENT EQUIPMENT AND COMPONENTS
2. TEMPORARY OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS, OR WATER.
3. MOVABLE EQUIPMENT WHICH IS STATIONED IN ONE PLACE FOR MORE THAN 8 HOURS AND HEAVIER THAN 400 POUNDS ARE REQUIRED TO BE ANCHORED WITH TEMPORARY ATTACHMENTS.

THE ATTACHMENT OF THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT BE DETAILED ON THE PLANS. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR HUNG FROM A WALL.

FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTES

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-10 SECTION 13.3 AS DEFINED IN ASCE 7-10 SECTION 13.6.8. 13.6.7, 13.6.5.6, AND 2019 CBC, SECTION 1616.

THE BRACING ATTACHMENTS TO THE STRUCTURE SHALL BE DETAILED ON THE APPROVED DRAWINGS OR THEY SHALL COMPLY WITH ONE OF THE PRE-APPROVALS (OPA #) AS MODIFIED TO SATISFY ANCHORAGE REQUIREMENTS OF ACI 318, APPENDIX D.

COPIES OF THE MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF HANGING AND BRACING OF THE PIPE, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS.

THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

HVAC SERVICE CHECK NOTES

PERFORM FULL SERVICE DIAGNOSTIC CHECK, INCLUDING BUT NOT LIMITED TO:

1. TIGHTEN ELECTRICAL CONNECTIONS TO ORIGINAL EQUIPMENT MINIMUM REQUIREMENTS.
2. CHECK AIRFLOW, REFRIGERANT LEVEL, CURRENT (AMP.) DRAW.
3. CLEAN EVAPORATOR AND CONDENSER COILS.
4. INSPECT INDOOR FAN COIL DRAIN PAN AND DRAIN LINES.
5. CLEAN FAN BLADES AND CHECK FOR DUCT LEAKS.
6. CHECK AND VERIFY ECONOMIZER OPERATION.
7. PROGRAM THERMOSTATS TO OWNER SETPOINT AND TIME REQUIREMENTS.
8. LUBRICATE ALL MOVING PARTS PER MANUFACTURER'S RECOMMENDATIONS.
9. REPLACE BELTS AND FILTERS.
10. CLEAN COOLING COILS (ROOFTOP UNIT ONLY).
11. COMB EVAPORATIVE SECTIONS (ROOFTOP UNIT ONLY).
12. INSPECT HEAT EXCHANGER AND BURNER COMBUSTION (HEATING SPECIFIC).
13. CHECK AND ENSURE REFRIGERANT LEVEL AND CHARGE ARE WITHIN THE MANUFACTURER'S OPERATIONAL GUIDELINES.
14. DYNAMICALLY BALANCE BLOWER MOTOR.

REPORT ANY DEFICIENCIES TO OWNER. **SUBMIT TO MEOR.**

HVAC GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO BE USED AS A GUIDE FOR THE INSTALLATION OF A COMPLETE MECHANICAL SYSTEM. CONTRACTOR SHALL AMEND ALL INFORMATION AS REQUIRED AS SITE CONDITIONS WARRANT.
2. WHERE INDICATED BY "**SUBMIT TO MEOR**", PROVIDE DETAILED SUBMITTALS FOR REVIEW BY MECHANICAL ENGINEER OF RECORD. ALL DRAWINGS SHALL BE IN 1/4"=1'-0" SCALE AND ELECTRONIC. ALL SUBMITTALS SHALL BE ELECTRONIC.
3. PROVIDE ALL EQUIPMENT AND LABOR NECESSARY FOR THE COMPLETE AND WORKABLE INSTALLATION OF ALL SPECIFIED AND OWNER SUPPLIED EQUIPMENT AND FIXTURES.
4. ALL WORK SHALL BE PERFORMED IN FULL ACCORDANCE WITH ALL APPLICABLE CODES AND ORDINANCES.
5. ALL DAMPERS INSTALLED OVER AREAS WITH HARD CEILINGS SHALL BE PROVIDED WITH EITHER REMOTE OPERATORS OR ACCESS PANELS.
6. COORDINATE LOCATION OF ALL ACCESS PANELS WITH ARCHITECTURAL PLANS
7. DO NOT CUT ANY STRUCTURAL MEMBERS OR STUDS WITHOUT PROPER COORDINATION WITH GENERAL CONTRACTOR AND STRUCTURAL DRAWINGS.
8. ALL DUCTWORK SHALL BE RUN PERPENDICULAR TO STRUCTURE UNLESS OTHERWISE NOTED.
9. DUCTWORK SHALL AVOID ARCHITECTURAL OPENINGS AND SHALL BE RUN CONCEALED UNLESS OTHERWISE NOTED.
10. DUCTWORK SHALL MAINTAIN A CLEARANCE OF 1" MINIMUM FROM ALL COMBUSTIBLE SURFACES.
11. ALL DUCT SIZES SHOWN REPRESENT CLEAR INSIDE DIMENSIONS UNLESS OTHERWISE NOTED. WHERE DUCT LINING OCCURS, INCREASE DUCT SIZE INDICATED TO SUIT.
12. CONTRACTOR SHALL VISIT SITE, AND FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BID. ANY DISCREPANCIES BETWEEN CONTRACT DOCUMENTS AND ACTUAL CONDITIONS SHALL BE SUBMITTED IN WRITING TO THE OWNER'S REPRESENTATIVE PRIOR TO BID.
13. ROOF MOUNTED DUCTWORK SHALL BE SLOPED TO SHED WATER.
14. ALL EQUIPMENT INSTALLED WITH SEISMIC VIBRATION ISOLATORS SHALL HAVE A MINIMUM 2" STATIC DEFLECTION.
15. REFRIGERANT PIPING SHALL BE SIZED AS RECOMMENDED BY THE MANUFACTURER.
16. PROVIDE COMBINATION FIRE/SMOKE DAMPERS AT ALL PENETRATIONS THROUGH FIRE RATED SHAFTS AND SEPARATIONS PER CALIFORNIA STATE FIRE MARSHAL REQUIREMENTS.
17. THE DRAWINGS REPRESENT THE DIAGRAMMATIC GRAPHICAL REPRESENTATION OF THE SCOPE OF WORK AND SHOULD NOT BE USED SOLELY TO DETERMINE SCOPE. CONTRACTORS SHALL BID THE ENTIRE SET OF CONTRACT DOCUMENTS INCLUDING CROSS DISCIPLINE INFORMATION AND WRITTEN SPECIFICATIONS. ALL BIDS BASED UPON DRAWING INFORMATION ONLY CAN BE ASSUMED TO BE INCOMPLETE AND INCONCLUSIVE TO DETERMINE ENTIRE SCOPE OF WORK.
18. AIR MOVING SYSTEMS SUPPLYING IN EXCESS OF 2000 CUBIC FEET PER MINUTE TO ENCLOSED SPACES WITHIN BUILDINGS SHALL BE EQUIPPED WITH AN AUTOMATIC SHUTOFF. SHUTOFFS SHALL STOP THE AIR-MOVING EQUIPMENT WHEN SMOKE IS DETECTED IN A SUPPLY-AIR DUCT OR WHEN SMOKE IS DETECTED IN ROOMS SERVED BY THE SYSTEM. EXCEPTIONS: (1) ROOMS HAVE A DIRECT EXIT TO THE EXTERIOR OF THE BUILDING, OR (2) SYSTEMS ARE DESIGNED FOR SMOKE CONTROL (SEC. 608, 2019 CMC)
19. CONTRACTOR SHALL VERIFY VOLTAGES AND ALL OTHER ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PRIOR TO ORDERING EQUIPMENT.
20. DESIGN AND EQUIPMENT PERFORMANCES ARE BASED ON THE EQUIPMENT SCHEDULED AND SPECIFIED HEREIN. ANY ALTERATIONS OR SUBSTITUTIONS OF ANY EQUIPMENT SHALL BE SUBMITTED, REVIEWED AND APPROVED BY THE ENGINEER OF RECORD PRIOR TO ORDERING OF EQUIPMENT.
21. PROVIDE LINE OR LOW VOLTAGE POWER WIRING FOR ALL CONTROLS. COORDINATE CONTROL SYSTEM POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR INCLUDING DAMPER MOTORS, CONTROL PANELS AND ALL DEVICES REQUIRING POWER. ALL WIRING AND COMPONENTS SHALL BY INSTALLED IN STRICT ACCORDANCE WITH THE CALIFORNIA ELECTRICAL CODE LATEST EDITION.
22. COORDINATE FINAL ELECTRICAL AMPERAGES AND VOLTAGES WITH ELECTRICAL CONTRACTOR PRIOR TO ORDERING EQUIPMENT.
23. FACTORY-MADE FLEXIBLE AIR DUCTS AND CONNECTORS SHALL BE NOT MORE THAN 5 FEET IN LENGTH AND SHALL NOT BE USED IN LIEU OF RIGID ELBOWS OR FITTINGS, PER 2019 CMC 603.4.1.
24. CALIFORNIA ENERGY CODE ACCEPTANCE TESTING: THE CALIFORNIA ENERGY CODE REQUIRES ACCEPTANCE TESTING ON MECHANICAL SYSTEMS. THE REQUIRED TESTS ARE INDICATED ON THE TITLE 24 DOCUMENTATION FORMS. ACCEPTANCE TESTING SHALL BE PERFORMED BY A CALIFORNIA CERTIFIED ACCEPTANCE TEST TECHNICIAN. ANY TESTS THAT DO NOT PASS SHALL BE SUBMITTED TO THE ARCHITECT AND ENGINEER FRO REVIEW. ALL NOTED ACCEPTANCE TESTING MUST BE PERFORMED PRIOR TO BENEFICIAL OCCUPANCY. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ACCEPTANCE TESTING AND SUBMIT COMPLETED ACCEPTANCE TEST FORMS TO THE AUTHORITY HAVING JURISDICTION.
25. DRAWINGS, SPECIFICATIONS, NOTES AND CALCULATIONS ARE FOR PERMIT SUBMITTAL ONLY TO THE AUTHORITY HAVING JURISDICTION. PLANS ARE NOT INTENDED FOR CONSTRUCTION, BIDDING AND/OR ESTIMATING UNTIL STAMPED AND SIGNED BY A LICENSED MECHANICAL ENGINEER AND THIS NOTE IS REMOVED.
26. PROVIDE ALL CONTROL WIRING AND DEVICES AS REQUIRED FOR A COMPLETE AND WORKABLE SYSTEM. ALL WIRING AND DEVICES SHALL BE IN STRICT ACCORDANCE WITH THE CALIFORNIA ELECTRICAL CODE. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL SUBCONTRACTOR.

DOCUMENT LIST

CONTRACTOR SHALL REVIEW ENTIRE CONSTRUCTION SET, INCLUDING, BUT NOT LIMITED TO ALL SPECIFICATIONS, DRAWINGS, PROJECT MANUAL, CALCULATIONS AND CUT-SHEETS. ADDITIONAL LIST OF DOCUMENTS AND DRAWINGS CONTAINED HEREIN, INCLUDE;

M0.01 HVAC NOTES, LEGEND, SCHEDULES AND ABBREVIATIONS
M0.02 HVAC SPECIFICATIONS
M0.03 HVAC SPECIFICATIONS
M1.01 HVAC DEMOLITION PLAN - GROUND FLOOR
M1.02 HVAC DEMOLITION PLAN - ROOF
M1.03 HVAC PLAN - GROUND FLOOR
M1.04 HVAC PLAN - ROOF
M5.01 HVAC DETAILS

15000 INC.
heating, ventilation, air conditioning + plumbing design and engineering
6085 STATE FARM DR. #130 phone: 707.577.0363
ROHNERT PARK, CA 94928 fax: 707.577.0364

REGISTERED PROFESSIONAL ENGINEER — MATTHEW J. TORRE — M 36958 — Exp 9/30/24 — MECHANICAL — STATE OF CALIFORNIA

SIGNED 5-20-2024

CLIENT: County of Sonoma
2300 County Center Drive, Suite A220
Santa Rosa, CA 95403

PROJECT TITLE: Sonoma Veteran's Memorial Hall HVAC Tenant Improvement
126 1st Street West
Sonoma, CA 95476

APPROVALS

#	REVISION	DATE
1	PLAN CHECK RESPONSE	05/21/2024

DRAWING TITLE: HVAC NOTES, LEGEND, SCHEDULES AND ABBREVIATIONS

ISSUE DATE	10/23/2023
ISSUE TYPE	OWNER REVIEW
DRAWN BY	RLY
CHECKED BY	MJT/JMT
SCALE	AS NOTED
PROJECT No.	1817.0.00

DRAWING: M0.01

230000 - GENERAL REQUIREMENTS

SECTION 23 00 00

GENERAL REQUIREMENTS - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

PART 1 - GENERAL

1.01 DESCRIPTION

A. The requirements of this section apply to all sections of Division 23.

1.02 WORK INCLUDED

A. Provide all materials, equipment, labor, fabrication, specialties, and items necessary and incidental to the installations of a complete system or piece of equipment.

B. Work included shall also include transportation, storage, utilities and required licenses and permits.

1.03 RELATED WORK AND REQUIREMENTS

A. The work of this Section shall require work in coordination with other Divisions outside of this Section as follows:

1. Section 01 00 00 General Requirements
2. Section 26 00 00 General Requirements, Electrical

1.04 QUALITY ASSURANCE

A. Comply with Division 01 requirements regarding Quality Control.

B. Mechanical, electrical and associated systems shall be safe, reliable, efficient, durable, easily and safely operable and maintainable, easily and safely accessible, and in compliance with applicable codes as specified. The systems shall be comprised of high quality institutional-class and industrial-class products of manufacturers that are experienced specialists in the required product lines. All construction firms and personnel shall be experienced and qualified specialists in their respective industrial and institutional HVAC system, as applicable.

C. Products Criteria:

1. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years. The design, model and size of each item shall have been in satisfactory and efficient operation on at least three installations for approximately three years. However, digital electronics devices, software and systems such as controls, instruments, computer work station, shall be the current generation of technology and basic design that has a proven satisfactory service record of at least three years. See other specification sections for any exceptions.
2. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.
3. Conform to codes and standards as required by the specifications. Conform to local codes, if required by local authorities such as the natural gas supplier, if the local codes are more stringent than those specified, the more stringent requirement shall be used.
4. Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.

1.05 SUBMITTALS

A. Comply with Division 01 requirements regarding submittals.

B. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements.

C. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.

D. Prior to submitting layout drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications, and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.

E. Upon request by Engineer, provide lists of previous installations for selected items of equipment. Include contact persons who will serve as references, with telephone numbers and e-mail addresses.

F. Submittals and layout drawings for interdependent items, containing applicable descriptive information, shall be furnished together and complete in a group. Coordinate and properly integrate materials and equipment in each group to provide a completely compatible and efficient installation. Final review and approvals will be made only by groups. Submittals and shop drawings shall also incorporate the following items

1. Clear and neat strike out of irrelevant information.
2. Clearly and neatly tag and mark equipment, options and specialties and special features.
3. Key tags to match tags on Drawings.
   a. If substituting on Specified equipment provide comprehensive written comparison of characteristics between specified and substituted equipment.
4. Provide information in an easily readable and legible format presentation.
5. Provide an index with corresponding labeled and tabbed dividers for sections, in a three ring hard cover binder or hard cover binding folder. Loose leaf sections, provided separately, shall not be acceptable. Front index shall include, at a minimum:
   a. Full, formal, name and address, including zip code, for job.
   b. Company name, address, phone and fax numbers of General Contractor, including phone land line number of job trailer and cellular phone number and name of job site Superintendent.
6. Submit all items at same time, including all controls information, in one binder/folder. Excluding controls for a later, separate, review shall not be acceptable.
7. Unless specified otherwise in Division 01 requirements submit 5 copies of data. Engineer will return 4 copies while retaining one for internal office use as a Project Record Document.
8. Paper copies shall be the only acceptable submittal medium, electronic submittals are not permitted unless specifically required by Division 01.
9. Submittals shall be prepared and submitted in a timely fashion to allow adequate time for ordering of long lead time equipment and materials.

1.06 CODES, REGULATIONS, STANDARDS, AND GUIDELINES

A. Work shall be in accordance with requirements of the latest jurisdiction adopted editions of the following:

1. CBC - California Building Code, 2016 Edition
2. CMC - California Mechanical Code, 2016 Edition
3. CPC - California Plumbing Code, 2016 Edition
4. CEC - California Electrical Code, Latest Edition
5. CFC - California Fire Code, Latest Edition
6. CEC - California Energy Commission, Title 24, Part VI

230000 - GENERAL REQUIREMENTS

B. The work shall comply with the latest editions of the following guidelines and standards:

1. AABC Associated Air Balance Council
2. AMCA Air Movement and Control Association
3. ANSI American National Standards Institute
4. ARI American Refrigeration Institute
5. ASHRAE American Society of Heating Refrigerating and Air Conditioning Engineers
6. ASME American Society of Mechanical Engineers
7. ASTM American Society for Testing and Materials
8. NFPA National Fire Protection Association
9. SMACNA Sheetmetal and Air-Conditioning Contractors National Association
10. UL Underwriters Laboratories

C. When the work calls for more stringent requirements than the above listings the Specifications and Drawings shall take precedence.

1.07 SITE VISIT AND FAMILIARIZATION

A. Visit the site and become familiar with the Drawings and Specifications. Examine the site and understand the conditions under which the Contract shall be performed.

B. Refer to Division 01 for any Pre-Bid Conference requirements.

PART 2 - PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery and handling shall be performed in accordance with manufacturer's recommendations. Provide dust and weather covers.

B. Protect materials from loss or damage. Lost or damaged materials shall be replaced with new at no increase in Contract Sum.

C. All mechanical equipment requiring power shall be installed with the required working spaces clearances required by the California Electrical Code, Table 110.26 (A)(1) Working Spaces.

D. All facility service piping and conduits shall be concealed behind finishes. No exposed piping or raceways will be permitted unless specifically noted in writing on the drawings. Coordinate with pertinent sections of other Divisions providing demolition and new finishes. Jointly determine extent of demolition and finish removal necessary to install all indicated facilities services systems concealed behind wall, floor, ceiling finishes.

3.02 PROTECTION OF WORK

A. Cap all duct, pipe and equipment openings daily to protect from dust, moisture and incidental debris. Equipment not capped shall be thoroughly cleaned prior to recommencing construction.

B. Porous materials that become wetted shall be replaced with new. Drying is not sufficient as it introduces the possibility of microbial growth. This applies to duct liner, insulation wrap, flex duct and any material that has the potential to absorb moisture.

C. All air distribution shall be capped during construction to prevent accumulation of dirt, dust and debris.

3.03 CLEANING AND PRESENTATION

A. Prepare Work for painting by leaving surfaces free of oil, dust, rust, scale, adhesions and debris.

B. Remove all shipping labels and tags.

C. Exterior surfaces of piping, insulation, ducting and equipment shall be left clean.

D. Inside visible portions of grille cans and adjacent ducting including insulation stick pins, dampers and specialties shall be painted with two coats of flat black paint.

E. Scratched and marred surfaces of factory painted equipment and materials shall be touched up with matching color/type paint.

1. Clean as recommended by manufacturer. Do not use material or methods which may damage finish surface or surrounding construction.

F. Cut ends of strut pieces and uncoated/non-galvanized steel materials exposed to the elements shall be painted with two coats of rust inhibiting paint with color and type matched to installation.

3.04 SAFETY

A. The contractor shall be solely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This shall also apply to normal and non-normal working hours.

3.05 CUTTING OF STRUCTURE

A. Do not cut beams, girders, columns, or any other structural members, or run any pipes, ducts or work through slabs, unless specifically shown on the Drawings, or unless written approval is obtained from the Owner.

B. Cutting of walls, floors, or other parts of the building or repairing any work due to neglect of properly directing the locations of necessary openings and framing beforehand shall be done at no additional cost to the Owner.

3.06 RECORD DRAWINGS

A. Contractor is required to provide record Drawings in accordance with Division 01 and this section.

B. Keep and accurate record of job progress including as-built locations and of the Work. Keep record up-to-date on legible copies as job progresses. Drawings shall be of the same size as provided to the contractor. Make available to Owner and Owner representatives during job.

3.07 COMPLETION

A. When work is completed, or when Owner or Owner representative directs, remove surplus equipment, material, waste, and rubbish and leave building in satisfactory condition.

B. Adjust and program thermostats and controls per owner direction and as indicated within Division 23 requirements.

3.08 WARRANTEES AND GUARANTEES

A. Contractor is required to provide warranties in accordance with Division 01 - General Requirements.

1. Collect all warranties and guarantees for materials and equipment and neatly fill out all required information for the Owner. Provide one copy of each certificate for turn over to Architect. Arrange certificates in a tabbed and indexed binder for Architect ease of use.

B. At the completion of the work contractor shall guarantee to repair or replace materials and workmanship found defective for a period of one year from date of filing of Notice of Completion. This work shall be performed at no cost to the Owner.

1. Work of other trades damaged as a result of faulty workmanship or materials shall be repaired at no cost to the Owner.

END OF SECTION

230001 - COORDINATION

SECTION 23 00 01

COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Provision of coordination of the Work of the Contract.

1.02 GENERAL COORDINATION

A. Contractor shall be responsible for all project coordination.

B. Coordinate schedules, submittals and work of the various trades to ensure efficient and orderly sequence of installation of construction, with provisions for accommodating items to be installed later. Coordinate the work among the Specifications and Drawings. Work shown on any drawing or specification is required by the Contract irrespective of the trade sub-division. Contractor shall require each trade subcontractor to review all other subdivisions of the documents for related work and shall coordinate the subcontracts accordingly.

C. Require all parties involved in the performance of the Work to cooperate in the overall coordination of the work under the direction of the Contractor. Each party, when requested to do so, shall furnish information concerning its portion of the work and shall respond promptly and reasonably to the decisions and requests of persons designated with coordination, supervisory, administrative, or similar authority.

D. The Drawings use graphic symbols to show certain physical relationships of the various elements and systems and their interfacing with other elements and systems. Establishing and coordinating the actual physical relationships is the responsibility of the Contractor. Layout and arrange all elements to contribute to safety and efficiency while maintaining the intent of the design. Before work proceeds in areas of potential conflict for installing different components of the work, Contractor shall prepare supplementary drawings for review by the Architect and resolve the conflict.

E. Coordinate continuous checking of architectural and structural clearances for accessibility of equipment and mechanical and their interfacing with other elements and systems. Establishing and coordinating the actual physical relationships is the responsibility of the Contractor. Layout and arrange all elements to contribute to safety and efficiency while maintaining the intent of the design. Before work proceeds in areas of potential conflict for installing different components of the work, Contractor shall prepare supplementary drawings for review by the Architect and resolve the conflict.

F. Prior to installation of each major unit of work which requires coordination and interfacing with other work, meet at project site with installer and representatives of manufacturers and fabricators who are involved in or affected by unit of work. Review progress of other work and preparations for particular work under consideration.

G. Coordinate the tolerances of all materials to ensure a proper fit in achieving the requirements of the Contract Documents.

H. Coordinate matching finish, texture, color, etc. for the new work on existing components in the project.

I. Coordinate work of like materials by submitting pilot samples to the Architect for review of acceptable ranges of finish textures and color variation.

J. Coordinate completion and cleanup Work of various trades in preparation for the Substantial Completion and for occupancy of the Building.

1.03 SUBCONTRACT COORDINATION

A. The General Contractor shall coordinate the Work and do not delegate responsibility for coordination to any Subcontractor.

B. Anticipate the interrelationship of all Subcontractors and their relationship with the Work.

C. Resolve differences or disputes between Subcontractors concerning coordination, interference, or extent of work between sections of the specifications. Contractor's decisions, if consistent with the Contract Document requirements, shall be final.

D. Coordinate the work of Subcontractors so that their portions of the work are performed in a manner that minimizes interference with the progress of the Work.

1.04 ADMINISTRATION

A. General: Prepare a written memorandum on required coordination activities. Include such items as required notices, reports and attendance at meetings. Distribute this memorandum to each trade performing work at the project site. Prepare similar memorandum for separate contractors where interfacing of their work is required.

B. Coordination Meetings: Conduct general project coordination meetings with Subcontractors at least weekly at regularly scheduled times convenient for all parties involved. These meetings are in addition to specific meetings held for other purposes, such as regular project meetings and special preinstallation meetings. Request representation at each meeting by every party currently involved in coordination or planning for the work of the entire project. Keep the Owner Representatives informed about coordination meetings. Conduct meetings in a manner which will resolve coordination problems. Record results and minutes of each meeting and distribute copies to everyone in attendance and to the Owner Representatives. Owner Representatives may attend weekly jobsite meetings with subcontractors.

C. Superintendent: Provide a full-time Superintendent experienced in administration and supervision of building construction. This Superintendent shall be authorized to act as general coordinator of interfaces between units of work. This Superintendent shall be on site, continuously during the construction period. Construction coordination shall be his/her principal duty.

1. For the purpose of this provision, "interface" is defined to include scheduling and sequencing of work, sharing of access to work spaces, installations, protection of each other's work, cutting and patching, tolerances, cleaning, selections for compatibility, preparation of coordination drawings, inspections, tests and temporary facilities and services.
2. Mechanical/Electrical Coordinator: Provide a single individual, a mechanical/ electrical coordinator, experienced in administrative and supervisory coordination of mechanical and electrical work. This experience in coordination shall include coordination of the type of mechanical/electrical work required for this project. The mechanical/electrical coordinator is required to act as the specialized coordinator of interfaces both within mechanical/electrical work and between that work and other trades. The Mechanical/Electrical Coordinator shall be on site, full time during the construction period. Project Superintendent may serve as mechanical/electrical coordinator.

1.05 COORDINATION DRAWINGS AND SUBMISSION

A. Prepare Coordination Drawings where required before beginning fabrication or delivery of materials and equipment to the jobsite.

1. Coordination Drawings shall clearly indicate coordination of mechanical, plumbing, fire protection, electrical, lighting, signal and equipment installations with structural, architectural and finish elements.
2. Scale: 1/2" = 1'-0". Scale may be revised to 1/4"=1'-0" with consent of all involved subcontractors.

B. Keep copies of Coordination Drawings at the jobsite.

C. Contractor shall provide the Owner with a record copy of initial Coordination Drawings and with revisions to Coordination Drawings, within three (3) working days of completion of each drawing or revised drawing and 30 days before work begins. The Owner will verify that Coordination Drawings have been made, but no approval of these drawings will be made. Include in submission of drawings the names of coordination staff.

D. Coordination Drawings shall include, but are not limited to: structural, fire protection, plumbing, heating, ventilation and air conditioning, electrical power and lighting, security, life safety, data, telephone system, existing or reinstalled equipment and new equipment.

E. Coordination Drawings, shall indicate layout of Work for all trades, for purposes of showing overlays and potential conflicts of crossover work and adjoining work.

F. Conditionally revise Coordination Drawings as subsequent work is added to areas containing existing work.

G. Provide dimensions and elevations where conflicts may exist and coordinate conflicts on Coordination Drawings to prevent conflicts in the field.

H. Contractor shall require Subcontractors to develop Subcontractor Coordination Plans of the same scale as Contractor's Coordination Drawings to assist in making transcripts for transfer to Coordination Drawings; use approved Shop Drawings for Coordination Drawings where available.

I. Coordination Drawings shall include dates and signatures of Contractor and Subcontractors involved in coordination; signed Coordination Drawings shall be subject to examination by the Owner at any time. Failure to maintain up_to_date drawings will be considered non-conformance with Contract Documents and progress payment will be withheld.

230001 - COORDINATION

A. Failure of Contractor to provide adequate coordination and Coordination Drawings shall not be grounds for adjustment of Project cost or extension of time.

1.06 STRUCTURAL, MECHANICAL, PLUMBING AND ELECTRICAL COORDINATION

A. Use Coordination Drawings of structural, mechanical, plumbing and electrical Work, together with shop drawings and layout drawings of affected Work to check, coordinate and integrate the Work to prevent interferences.

B. Coordinate space requirements and installation of mechanical and electrical Work which are indicated by graphic symbols on Contract Documents.

C. Routing shown for pipes, ducts and conduits on Drawings are shown by graphic symbols only; make runs parallel with lines of building.

D. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance and for repairs.

E. Conceal pipes, ducts and wiring in finished areas, unless otherwise indicated; coordinate locations of fixtures and outlets with finish elements.

F. Where there is a potential conflict in the layout or interferences between the work, including structural and architectural, layout the work with tape or other means to depict the layout on site to reduce or resolve the conflict and to allow the Owner to review the work prior to execution. The tape or other means to depict layout shall not cause any damage, change in color or appearance of any work to remain, or leave a residue.

G. Contractor shall coordinate steel shop drawings to include any and all penetrations of framing members resulting from the coordination of and with the work of the mechanical and electrical subcontractors. See Section 05120 for additional structural coordination requirements.

1. Steel shop drawings shall be reviewed and approved by the mechanical, electrical and plumbing subcontractors prior to submission and fabrication.

1.07 INTERSTITIAL SPACE COORDINATION

A. Contractor shall provide Coordination Drawings for the Interstitial Spaces to resolve installation conflicts prior to final approval of any shop drawings.

B. All conflicts shall be brought to the attention of the Architect.

C. Elements to include in the Coordination Drawings:

1. Mechanical ducts and pipes, including floor penetrations.
2. Plumbing pipes.
3. Fire branch lines and sprinkler heads.
4. Electrical bus ducts.
5. Telephone communication and data lines.
6. Interstitial space access.
7. Structural elements including, but not limited to, beams, columns, slabs, hangers and seismic bracing.
8. Suspended ceilings.
9. Insulation.
10. Security system elements.
11. Others as necessary.

D. Schedule of Submission

1. Refer to ACoordination Drawings and Submission@ specified in this Section.
2. Review of the coordinated drawings shall be required prior to approval of any of the sub-system shop drawings for the elements listed above.

E. An as-built version of this drawing should be required at the end of installation.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

230593 - TAB

SECTION 23 05 93

TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Work Included: This Section covers requirements for testing, adjusting, and balancing work for the air distribution systems and associated equipment and apparatus described herein.

B. All work of this section shall comply with Section 23 00 00 GENERAL REQUIREMENTS - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC).

1.02 QUALITY ASSURANCE

A. Engage the services of an independent balancing and testing agency specializing in the balancing and testing of heating, ventilating and air conditioning systems to perform the work.

B. TAB Agency:

1. The TAB agency shall be a subcontractor of the General Contractor and shall report to and be paid by the General Contractor.
2. The TAB agency shall be a certified member of AABC to perform TAB service for HVAC, water balancing and vibrations and sound testing of equipment. The certification shall be maintained for the entire duration of duties specified herein. If, for any reason, the agency loses subject certification during this period, the General Contractor shall immediately notify the Engineer of Record and submit another TAB firm for approval. Any agency that has been the subject of disciplinary action by AABC within the five years preceding Contract Award shall not be eligible to perform any work related to the TAB. All work performed in this Section and in other related Sections by the TAB agency shall be considered invalid if the TAB agency loses its certification prior to Contract completion, and the successor agency's review shows unsatisfactory work performed by the predecessor agency.

C. TAB Specialist:

1. The TAB specialist shall be a member of AABC. The certification shall be maintained for the entire duration of duties specified herein. If, for any reason, the Specialist loses subject certification during this period, the General Contractor shall immediately notify the Resident Engineer and submit another TAB Specialist for approval. Any individual that has been the subject of disciplinary action by the AABC within the five years preceding Contract Award shall not be eligible to perform any duties related to the HVAC systems, including TAB. All work specified in this Section and in other related Sections performed by the TAB specialist shall be considered invalid if the TAB Specialist loses its certification prior to Contract completion and must be performed by an approved successor.
2. TAB Specialist shall be identified by the General Contractor within 60 days after the notice to proceed. The TAB specialist will be coordinating, scheduling and reporting all TAB work and related activities and will provide necessary information as required by the Resident Engineer. The responsibilities would specifically include:
   a. Shall directly supervise all TAB work.
   b. Shall sign the TAB reports that bear the seal of the TAB standard. The reports shall be accompanied by report forms and schematic drawings required by the TAB standard, AABC.
   c. Would follow all TAB work through its satisfactory completion.
   d. Shall provide final markings of settings of all HVAC adjustment devices.
   e. Permanently mark location of duct test ports.
3. All TAB technicians performing actual TAB work shall be experienced and must have done satisfactory work on a minimum of 3 projects comparable in size and complexity to this project. Qualifications must be certified by the TAB agency in writing.
4. Test Equipment Criteria: The instrumentation shall meet the accuracy/calibration requirements established by AABC National Standards. Provide calibration history of the instruments to be used for test and balance purpose.
5. Tab Criteria:
   a. One or more of the applicable AABC or SMACNA publications, supplemented by ASHRAE Handbook "HVAC Applications" Chapter 36, and requirements stated herein shall be the basis for planning, procedures, and reports.
   b. Exhaust hoods/cabinets: 0 percent to plus I0 percent.
6. Minimum outside air: 0 percent to plus 10 percent.
7. Individual room air outlets and inlets, and air flow rates not mentioned above: Minus 2 percent to plus I0 percent except if the air to a space is 100 CFM or less the tolerance would be 0 to plus 5 percent.
   c. Systems shall be adjusted for energy efficient operation as described in PART 3.
   d. Typical TAB procedures and results shall be demonstrated to the Resident Engineer for one air distribution system (including all fans, three terminal units, three rooms) and one hydronic system (pumps and three coils) as follows:
1. When field TAB work begins.
2. During each partial final inspection and the final inspection for the project if requested by VA.

D. AABC Compliance: Comply with AABC's Manual MN_1 "AABC National Standards", as applicable to mechanical air distribution systems and associated equipment and apparatus, except as otherwise specified.

E. Industry Standards: Comply with American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise specified.

1.03 SUBMITTALS

A. Comply with Submittal Requirements of Division 01.

B. Submit names and qualifications of TAB agency and TAB specialists within 60 days after the notice to proceed. Submit information on three recently completed projects and a list of proposed test equipment.

C. For use by the Resident Engineer staff, submit one complete set of applicable AABC publications that will be the basis of TAB work.

D. Submit Following for Review and Approval:

1. Systems inspection report on equipment and installation for conformance with design.
2. Include in final reports uncorrected installation deficiencies noted during TAB and applicable explanatory comments on test results that differ from design requirements.
3. Submit certification that balancing personnel have been trained in accordance with AABC standards.
4. Submit certification of test equipment calibration and currency.
5. Maintenance Data: Include in maintenance manuals, copies of certified test reports.
6. Submit certified test reports signed by the Test and Balance Supervisor who performed testing and balancing work. In addition, have report certified by a Registered Professional Engineer who is familiar with testing and balancing work and also with project.

E. Prior to request for Final or Partial Final inspection, submit completed Test and Balance report for the area.

F. Make all other submittals specified under this Section.

1.04 JOB CONDITIONS

A. Do not proceed with TAB work until work has been completed and is operable. Ensure that there is no latent residual work still to be completed.

B. Do not proceed until work scheduled for testing, adjusting, and balancing is clean and free from debris, dirt and discarded building materials.

PART 2 - PRODUCTS

2.01 GENERAL

A. PATCHING MATERIALS: Except as otherwise indicated, use same products as used by original installer for patching holes in insulation, ductwork and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes. In each case, patching shall be completed by original installer.

B. TEST INSTRUMENTS: Utilize test instruments and equipment for testing and balancing work required, of type, precision, and capacity as recommended in AABC's Manual MN_1 "AABC National Standards".

230593 - TAB

2.02 PLUGS

A. Provide plastic plugs to seal holes drilled in ductwork for test purposes.

2.03 INSULATION REPAIR MATERIAL

A. Provide for repair of insulation removed or damaged for TAB work.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Do not proceed with testing and balancing work until unsatisfactory conditions have been corrected in manner acceptable to Tester.

B. Patch holes in insulation, ductwork and housings, which have been cut or drilled for test purposes.

C. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers and similar controls and devices, to show final settings at completion of testing and balancing work. Provide markings with paint or other suitable permanent identification materials.

D. Prepare a report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced, including, where necessary, modifications which exceed requirements of the Contract Documents. Submit report to the Engineer for review. Carry out corrective modifications as approved by the Engineer.

E. Retest, adjust, and balance systems subsequent to significant system modifications, and resubmit test results.

F. Units shall not be operated without air filters. Air filters shall be replaced completely after construction is complete and just prior to air balancing.

3.02 BALANCING PROCEDURES - AIR SYSTEMS

A. Prior to balancing, the Contractor shall complete construction of air handling system with all components installed, and controls operative and calibrated. Schedule balancing for completion four calendar weeks prior to the completion of the building or the area the air system is servicing.

B. Before balancing, check alignment of fan and motor sheaves.

C. Set all fans at rated speeds for design volumes and pressure. Simultaneously operate all supply and exhaust systems serving common areas on 100% outside air or full recirculation throughout the balancing period.

D. Measure flow and pressure in ducts by means of pitot tube and manometer or U_gage having a minimum sensitivity of 0.02 inch of water.

E. For rectangular ducts, take readings at the center point of equal rectangles with not less than 16 and a maximum of 64 readings. Center distances between rectangular areas shall be not more than 6 inches. Take readings as far downstream of fittings as is practicable up to an equivalent of seven duct diameters.

F. Measure fan and motor speed with a direct reading tachometer and Strobo Tach. Measure amperage and voltage with direct connected or clamp_on instruments.

G. Measure flow at air outlets and inlets with velometer in accordance with air outlet manufacturer's instructions.

H. Submit to the Engineer duplicate copies of final test and balancing measurements, drawings and operating data on fan curves.

I. Determine actual air volume delivery of all fans by measuring fan performance point on fan pressure volume curve.

J. Test and record static pressure drop across all filters and note the condition of the filter at the time of test.

K. Test and record entering and leaving db and wb temperature after the air systems have been balanced. Note whether system is on the heating or ventilation cycle.

L. After all fans have been adjusted, proceed with balancing of systems. Adjust outside quantities by temperature of outside air, recirculated air and mixture on a day in which outside air is at least 30 °F colder than room air. Maximum and minimum air volumes through outdoor, return and exhaust air combination are to be adjusted in conjunction with automatic controls manufactured by means of linkage stops on damper motors.

M. Where duct joints present leakage, the contractor shall reseal joints with 3M EC_800 cement, or equal.

N. The following data shall be measured and recorded for all systems after balancing and adjusting to within limits specified herein, for submission of balancing report:

1. Fan Data:
   a. Manufacturer and model number (where available)
   b. CFM, design vs. actual
   c. RPM
   d. Inlet static pressure
   e. Discharge static pressure
   f. Total static pressure
   g. For purpose of balancing, fan BHP shall be calculated as follows:
2. Motor Data:
   a. Manufacturer model number
   b. Horsepower
   c. Phase
   d. Frequency
   e. NEMA code letter
   f. Rated vs. actual volts
   g. Rated vs. actual amperes
   h. Calculated operating BHP
   i. Locked rotor amperes
3. Air Outlet Data:
   a. Schedule showing all air outlet locations and numbers assigned to outlets for purpose of test
   b. Air outlet manufacturer and model number where available
   c. Size
   d. CFM, design
   e. CFM, actual
   f. CFM, percentage above or below design
4. Outdoor Air Data:
   a. Outdoor air temperature
   b. Return air temperature
   c. Mixed air temperature with averaged traverse readings

END OF SECTION

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REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. TORRES
M 36958
Exp 9/30/24
MECHANICAL
STATE OF CALIFORNIA

SIGNED 5-20-2024

CLIENT

County of Sonoma
2300 County Center Drive, Suite A220
Santa Rosa, CA 95403

PROJECT TITLE

Sonoma Veteran's Memorial Hall HVAC Tenant Improvement

126 1st Street West
Sonoma, CA 95476

APPROVALS

#	REVISION	DATE
1	PLAN CHECK RESPONSE	05/21/2024
2		
3		
4		
5		
6		

DRAWING TITLE

HVAC SPECIFICATIONS

ISSUE DATE	10/23/2023
ISSUE TYPE	OWNER REVIEW
DRAWN BY	RLY
CHECKED BY	MJT/JMT
SCALE	AS NOTED
PROJECT No.	1817.0.00

DRAWING

M0.02

230700 - INSULATION

SECTION 23 07 00
THERMAL INSULATION FOR MECHANICAL SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The work covered under this section consists of providing all necessary labor, supervision, materials, equipment and services to completely execute the complete HVAC system insulation work for equipment, piping, ductwork and other items where shown on the drawings and required herein.

B. All insulation that is exposed to weather shall be protected with weather covers of stainless steel or aluminum jacketing.

C. Insulate equipment and products at the following locations;

1. Where the fluid being transported is 60 degrees Fahrenheit or below in temperature.

2. Where the fluid being transported is 100 degrees Fahrenheit or above in temperature.

3. All hot surfaces above 120 degrees in temperature to prevent personnel burns.

4. All condensate pans serving HVAC equipment.

5. All piping, equipment, ducting, valves, etc., which require insulation but come uninsulated from the manufacturer.

1.02 REFERENCES

A. Insulation work shall comply with the requirements of the 2016 California Energy Commission requirements.

PART 2 - PRODUCTS

2.01 GENERAL

A. Fire Rating of all insulation shall have a composite (insulation, jacket/facing and adhesive used to adhere facing or jacket to insulation) fire and smoke hazard, as tested by ASTM E84, UL 263, and UL 723, not to exceed a flame spread of 25 and smoke developed by 50.

2.02 REFRIGERANT PIPING INSULATION

A. Insulation shall be flexible, closed cell elastomeric pipe insulation: AP Armaflex, AC Armaflex.

1. Adhesive shall be Armaflex 520 or 520 BLV Adhesive. Insulation shall conform to ASTM C534 Grade 1, Type 1.

2.03 DUCT AND PLENUM INSULATION

A. Linings:

1. Duct linings shall be flexible, coated, fiberglass, 1 inch minimum thickness (2 inch minimum thickness for exterior ducts), minimum density of 1.5 pounds per cubic foot, maximum thermal conductivity of 0.26 BTUH per sq. ft. degree F/in. at 75 degrees, and minimum noise reduction coefficient of 0.60 for 1 inch thickness.

2. Plenum linings shall be rigid, neoprene coated fiberglass board, 2 inch thickness, minimum density of 3.0 pounds per cubic foot, maximum thermal conductivity of 0.23 btu/h per sq. ft. degree F/in. at 75 degrees, and minimum noise reduction coefficient of 0.90 for 2 inch thickness.

3. Comply with SMACNA Duct Liner Application Standard and manufacturers recommendations.

2.04 PIPE INSULATION METAL JACKETING

A. Provide 0.016 inch thick factory made pipe insulation waterproof aluminum jacketing for all insulated pipe installed outside, exposed to weather. Metal jacketing shall include Z-joints at longitudinal seams arranged to prevent water from entering, and use factory applied stainless steel butt straps at transverse joints.

B. All insulation ends, longitudinal seams, and transverse joints shall be sealed with tape sealant to prevent rainwater from entering the insulating system. At valves, gauges and other hydronic specialties requiring periodic access provide outdoor type removable and re-sealable weatherproof jackets.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation products in accordance with the manufacturer's written instruction, commercial and industrial standards, and recognized industry practices to ensure that the insulation serves the intended purpose. Surfaces shall be thoroughly cleaned with all testing successfully completed prior to insulating.

B. Provide complete weather protection for all outdoor piping insulation.

3.02 INSULATION LOCATIONS

A. Apply insulation by type and location as follows:

1. Refrigerant Piping

a. Insulate suction lines continuously from outlet of evaporator coil to the suction valve at the compressor

1. Insulation thickness shall be 1 inch, minimum.

2. Ductwork

3.03 REFRIGERANT PIPING APPLICATION

A. All refrigerant piping shall be free of extraneous chemicals such as corrosive cleaners or building material's dust prior installation

B. Refrigerant piping shall be sealed while slipping on insulation to prevent foreign matter from entering tube.

C. Insulation is to be slid onto pipes. Longitudinal slitting of the insulation shall not be allowed except on mitered sections. Insulation shall be pushed, not pulled.

D. Insulation shall be mitered, pre-adhered and longitudinally slit inside throat to fit over traps, tees, elbows or bens over 90 degrees.

E. All butt joints and mitered seams shall be adhered with full coverage of adhesive on both surfaces. Insulation shall not be stretched when adhering.

F. Hangers clamped directly to the pipes shall be insulated over the hanger; insulation shall be fully adhered to the hanger. All seams shall be sealed with adhesive.

G. All insulation exposed to sunlight or installed outdoors shall be protected with two coats of WB Armaflex Finish or two coats of weather resistant coating.

3.04 DUCTWORK APPLICATION

A. After ductwork testing has been completed insulate ductwork as specified. On ducts over 18 inches wide apply weld clips or stick clips to bottom of duct, space 18 inches on center each way, maximum. Seal all longitudinal and transverse seams and all punctures caused by weld clips or stick clips with 2" wide SMACNA labeled, and manufacturer approved, duct tape and mastic.

B. Provide staples, bands, wires, tape, anchors, corner angles, cements, adhesives, coatings, sealers, protective finishes, and similar compounds as recommended by the insulation manufacturer to the applications indicated.

C. Insulate all air distribution (grilles, register and diffusers) not factory insulated with fiberglass duct-wrap where located in ceilings or spaces not used as return air plenums.

D. Install insulation materials with smooth, even surfaces.

E. Clean and dry all ductwork prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.

F. Extend duct-wrap insulation without interruption though walls, floors, and similar ductwork penetrations, except where otherwise indicated.

END OF SECTION

232300 - REFRIGERANT PIPING

SECTION 23 23 00
REFRIGERANT PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide complete piping, specialties, installation and tests in conformity with applicable codes and authorities having jurisdiction for the Work as required by this Section for HVAC equipment indicated on the Contract Drawings and contained herein.

B. Refrigerant systems include;

1. Field refrigerant piping for direct expansion HVAC system & Field refrigerant piping and associated drain and condenser water piping for walk-in coolers and freezers, including required pipe insulation.

PART 2 - PRODUCTS

2.01 PIPING AND FITTINGS

A. Refrigerant Piping: For piping up to 4 inches use Copper refrigerant tube, ASTM B280, cleaned, dehydrated and sealed, marked ACR on hard temper straight lengths. Coils shall be tagged ASTM B280 by the manufacturer. For piping over 4 inch use A53 Black SML steel.

B. Fittings, Valves and Accessories:

1. Copper fittings: Wrought copper fittings, ASME B16.22.

a. Brazed Joints, refrigerant tubing: Cadmium free, AWS A5.8/A5.8M, 45 percent silver brazing alloy, Class BAg-5.

b. Solder Joints, water and drain: 95_5 tin_antimony, ASTM B32 (95TA).

2. Flanges and flanged fittings: ASME B16.24.

3. Refrigeration Valves:

a. Stop Valves: Brass or bronze alloy, pack-less, or packed type with gas tight cap, frost proof, back seating.

b. Solenoid Valves: Comply with ARI 760 and UL 429, UL-listed, two-position, direct acting or pilot-operated, moisture and vapor_proof type of corrosion resisting materials, designed for intended service, and solder-end connections. Fitted with suitable NEMA 250 enclosure of type required by location and normally closed holding coil.

c. Thermostatic Expansion Valves: Comply with ARI 750. Brass body with stainless-steel or non-corrosive nonferrous internal parts, diaphragm and spring-loaded (direct-operated) type with sensing bulb and distributor having side connection for hot-gas bypass and external equalizer. Size and operating characteristics as recommended by manufacturer of evaporator and factory set for superheat requirements. Solder-end connections. Testing and rating in accordance with ASHRAE Standard 17.

d. Strainers: Designed to permit removing screen without removing strainer from piping system, and provided with screens 80 to 100 mesh in liquid lines NPS 1 and smaller, 60 mesh in liquid lines larger than NPS 1, and 40 mesh in suction lines. Provide strainers in liquid line serving each thermostatic expansion valve, and in suction line serving each refrigerant compressor not equipped with integral strainer.

4. Refrigerant Moisture/Liquid Indicators: Double_ported type having heavy sight glasses sealed into forged bronze body and incorporating means of indicating refrigerant charge and moisture indication. Provide screwed brass seal caps.

5. Refrigerant Filter/Dryers: UL listed, angle or in-line type, as shown on drawings. Conform to ARI Standard 730 and ASHRAE Standard 63.1. Heavy gage steel shell protected with corrosion-resistant paint; perforated baffle plates to prevent desiccant bypass. Size as recommended by manufacturer for service and capacity of system with connection not less than the line size in which installed. Filter driers with replaceable filters shall be furnished with one spare element of each type and size.

6. Flexible Metal Hose: Seamless bronze corrugated hose, covered with bronze wire braid, with standard copper tube ends. Provide in suction and discharge piping of each compressor.

2.03 PIPE INSULATION FOR DX HVAC SYSTEMS

A. Refer to Section 23 07 00 Thermal Insulation for Mechanical Systems.

2.04 PIPE INSULATION FOR WALK_IN COOLERS AND FREEZERS

A. Insulate refrigerant suction piping from unit cooler to condensing unit. Use 3/4-inch thick insulation on piping inside the refrigerator or freezer and 1_1/2 inch thick insulation (double layer required) on piping outside the refrigerated space.

B. Insulate unit cooler drain piping in freezer units, over electric heat tracing system, to prevent drain from freezing during defrost.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install refrigerant piping and refrigerant containing parts in accordance with ASHRAE Standard 15 and ASME B31.5

1. Install piping as short as possible, with a minimum number of joints, elbow and fittings.

2. Install piping with adequate clearance between pipe and adjacent walls and hangers to allow for service and inspection. Space piping, including insulation, to provide 1 inch minimum clearance between adjacent piping or other surface. Use pipe sleeves through walls, floors, and ceilings, sized to permit installation of pipes with full thickness insulation.

3. Locate and orient valves to permit proper operation and access for maintenance of packing, seat and disc. Generally locate valve stems in overhead piping in horizontal position. Provide a union adjacent to one end of all threaded end valves. Control valves usually require reducers to connect to pipe sizes shown on the drawing.

4. Use copper tubing in protective conduit when installed below ground.

5. Install hangers and supports per ASME B31.5 and the refrigerant piping manufacturer's recommendations.

6. Verify refrigerant pipe sizes and install in accordance with manufacturer's pipe size recommendations.

B. Joint Construction:

1. Brazed Joints: Comply with AWS "Brazing Handbook" and with filler materials complying with AWS A5.8/A5.8M.

a. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper tubing.

b. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

c. Swab fittings and valves with manufacturer's recommended cleaning fluid to remove oil and other compounds prior to installation.

d. Pass nitrogen gas through the pipe or tubing to prevent oxidation as each joint is brazed. Cap the system with a reusable plug after each brazing operation to retain the nitrogen and prevent entrance of air and moisture.

C. Protect refrigerant system during construction against entrance of foreign matter, dirt and moisture; have open ends of piping and connections to compressors, condensers, evaporators and other equipment tightly capped until assembly.

D. Pipe relief valve discharge to outdoors for systems containing more than 100 lbs. of refrigerant.

E. Firestopping: Fill openings around uninsulated piping penetrating floors or fire walls, with firestop material.

3.02 PIPE AND TUBING INSULATION

A. Apply two coats of weather-resistant finish as recommended by the manufacturer to insulation exposed to outdoor weather.

3.04 SYSTEM TEST AND CHARGING

A. System Test and Charging: As recommended by the equipment manufacturer.

END OF SECTION

233113 - METAL DUCTS

SECTION 23 31 13
METAL DUCTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide complete materials, equipment, fabrications, installation and tests in conformity with applicable codes and authorities having jurisdiction for the following:

1. Ductwork and Plenums

2. Balancing dampers

3. Backdraft dampers

4. All duct accessories

1.02 QUALITY ASSURANCE

A. In addition to Section 23 00 00 GENERAL REQUIREMENTS - HEATING, VENTILATING, AND AIR-CONDITIONING quality assurance requirements the ductwork shall:

1. Duct System Construction and Installation: Referenced SMACNA Standards are the minimum acceptable quality.

2. Duct Sealing, Air Leakage Criteria, and Air Leakage Tests: Ducts shall be sealed as per duct sealing requirements of SMACNA HVAC Air Duct Leakage Test Manual for duct pressure classes shown on the drawings.

3. Duct accessories exposed to the air stream, such as dampers of all types (except smoke dampers) and access openings, shall be of the same material as the duct or provide at least the same level of corrosion resistance.

1.03 APPLICABLE PUBLICATIONS

PART 2 - PRODUCTS

2.01 DUCT MATERIALS AND SEALANTS

A. General: Except for systems specified otherwise, construct ducts, casings, and accessories of galvanized sheet steel, ASTM A653, coating G90; or, aluminum sheet, ASTM B209, alloy 1100, 3003 or 5052.

2.02 DUCT CONSTRUCTION AND INSTALLATION

A. Kitchen and Grill Hood (Ventilator) Exhaust Ducts: Comply with NFPA 96.

1. Material: 16 gauge steel sheet (black iron), ASTM A1011, or 18 gage stainless steel. Use stainless steel for exposed duct in occupied areas. See Optional Duct Materials.

2. Construction: Liquid tight with continuous external weld for all seams and joints. Provide access doors or panels for duct cleaning inside of horizontal duct at 20 feet intervals, and at each change of direction.

3. Access doors or panels shall be of the same material and thickness of the duct with gaskets and sealants that are rated 1500 degrees F and shall be grease-tight.

B. Round Ducts: Furnish duct and fittings made by the same manufacturer to insure good fit of slip joints. When submitted and approved in advance, round and flat oval duct, with size converted on the basis of equal pressure drop, may be furnished in lieu of rectangular duct design shown on the drawings.

C. Casings and Plenums: Construct in accordance with SMACNA HVAC Duct Construction Standards Section 6, including curbs, access doors, pipe penetrations, eliminators and drain pans. Access doors shall be hollow metal, insulated, with latches and door pulls, 20 inches wide by 48 _ 54 inches high. Provide view port in the doors where shown. Provide drain for outside air louver plenum. Outside air plenum shall have exterior insulation. Drain piping shall be routed to the nearest floor drain.

D. Volume Dampers: Single blade or opposed blade, multi_louver type as detailed in SMACNA Standards. Refer to SMACNA Detail Figure 2-12 for Single Blade and Figure 2.13 for Multi-blade Volume Dampers.

E. Duct Hangers and Supports: Refer to SMACNA Standards Section IV. Avoid use of trapeze hangers for round duct.

2.03 DUCT LINER

A. Duct sizes shown on drawings for lined duct are clear opening inside lining.

2.04 DUCT ACCESS DOORS, PANELS AND SECTIONS

A. Provide access doors, sized and located for maintenance work, upstream, in the following locations:

1. Each duct mounted coil.

2. Each fire damper (for link service), smoke damper and automatic control damper.

3. Each duct mounted smoke detector.

4. For kitchen hood exhaust duct, locate access doors at 20 feet intervals and at each change in duct direction.

B. Openings shall be as large as feasible in small ducts, 12 inch by 12 inch minimum where possible. Access sections in insulated ducts shall be double_wall, insulated. Transparent shatterproof covers are preferred for uninsulated ducts.

1. For rectangular ducts: Refer to SMACNA HVAC Duct Construction Standards (Figure 2_12).

2. For round and flat oval duct: Refer to SMACNA HVAC duct Construction Standards (Figure 2-11).

2.05 FIRE DAMPERS

A. Galvanized steel, interlocking blade type, UL listing and label, 1_1/2 hour rating, 160 degrees F fusible line, 100 percent free opening with no part of the blade stack or damper frame in the air stream.

B. Fire dampers in wet air exhaust shall be of stainless steel construction, all others may be galvanized steel.

C. Minimum requirements for fire dampers:

1. The damper frame may be of design and length as to function as the mounting sleeve, thus eliminating the need for a separate sleeve, as allowed by UL 555. Otherwise provide sleeves and mounting angles, minimum 14 gage, required to provide installation equivalent to the damper manufacturer's UL test installation.

2. Submit manufacturer's installation instructions conforming to UL rating test.

2.06 SMOKE DAMPERS

A. Maximum air velocity, through free area of open damper, and pressure loss: Low pressure and medium pressure duct (supply, return, exhaust, outside air): 1500 fpm. Maximum static pressure loss: 0.13 inch W.G.

B. Maximum air leakage, closed damper: 4.0 CFM per square foot at 3 inch W.G. differential pressure.

C. Minimum requirements for dampers:

1. Shall comply with requirements of Table 6-1 of UL 555S, except for the Fire Endurance and Hose Stream Test.

2. Blades: Galvanized steel, parallel type preferably, 12 inch maximum width, edges sealed with neoprene, rubber or felt, if required to meet minimum leakage. Airfoil (streamlined) type for minimum noise generation and pressure drop are preferred for duct mounted dampers.

D. Motor operator (actuator): Provide electric as required by the automatic control system, externally mounted on stand-offs to allow complete insulation coverage.

2.07 COMBINATION FIRE AND SMOKE DAMPERS

A. Combination fire and smoke dampers: Multi_blade type units meeting all requirements of both fire dampers and smoke dampers shall be used where shown and may be used at the Contractor's option where applicable.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION

A. Fabricate and install ductwork and accessories in accordance with referenced SMACNA Standards:

1. Drawings show the general layout of ductwork and accessories but do not show all required fittings and offsets that may be necessary to connect ducts to equipment, boxes, diffusers, grilles, etc., and to coordinate with other trades. Fabricate ductwork based on field measurements. Provide all necessary fittings and offsets at no additional cost to the owner. Coordinate with other trades for space available and relative location of HVAC equipment and accessories on ceiling grid. Duct sizes on the drawings are inside dimensions which shall be altered by Contractor to other dimensions with the same air handling characteristics where necessary to avoid interferences and clearance difficulties.

2. Provide duct transitions, offsets and connections to dampers, coils, and other equipment in accordance with SMACNA Standards, Section II. Provide streamliner, when an obstruction cannot be avoided and must be taken in by a duct. Repair galvanized areas with galvanizing repair compound.

3. Provide bolted construction and tie_rod reinforcement in accordance with SMACNA Standards.

4. Construct casings, eliminators, and pipe penetrations in accordance with SMACNA Standards, Chapter 6. Design casing access doors to swing against air pressure so that pressure helps to maintain a tight seal.

B. Install duct hangers and supports in accordance with SMACNA Standards, Chapter 4.

C. Install fire dampers, smoke dampers and combination fire/smoke dampers in accordance with the manufacturer's instructions to conform to the installation used for the rating test. Install fire dampers, smoke dampers and combination fire/smoke dampers at locations indicated and where ducts penetrate fire rated and/or smoke rated walls, shafts and where required by the Resident Engineer. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges per UL and NFPA. Demonstrate re_setting of fire dampers and operation of smoke dampers to the Engineer.

D. Where diffusers, registers and grilles cannot be installed to avoid seeing inside the duct, paint the inside of the duct with flat black paint to reduce visibility.

E. Low Pressure Duct Liner: Install in accordance with SMACNA, Duct Liner Application Standard.

F. Ducts exposed to the weather:

1. Make ducts watertight with tops sloped to shed water. Standing pools of water on top of ducts shall not be allowed.

a. Arrange seams to not act as dams.

b. Place longitudinal seams at bottom of ducts.

c. Insure water runoff by sloping entire top of duct down toward sides.

d. Longitudinal seams and non-bolted joints shall be sealed with SMACNA approved duct sealant for both interior and exterior applications.

e. Bolted duct joints: Top of duct shall have a continuous metal cleat from corner to corner to provide a weather cap. The sides, end and bottom shall have intermediate 6" pieces of metal cleats so that any water can drain away.

G. Construct with gauges, joints, bracing, reinforcing, and other details per latest edition of the CMC, AHSRAE, SMACNA and NFPA. Comply with most stringent requirement. Provide ducts with CMC required gauges when penetrating rated construction.

H. Provide for duct rigidity by either beading at 12 inches on center, maximum, or crossbreaking outward in ducts with positive pressures and crossbreaking inward for ducts having negative pressures. The exception is for ducts exposed to weather which shall crossbreak outward on top of duct.

I. At exposed duct penetrations of walls, floors and ceilings provide sheet metal angle type escutcheons with no sharp corners or edges. For round ducts factory angle rings may be used.

J. Frame, trim, caulk and seal all duct penetrations through acoustical walls and partitions.

K. Tapers:

1. Pitch sides of ducts in diverging or converging airflow with a maximum 1 to 4 taper. Abrupt bushing type fitting shall not be permitted.

L. Duct openings:

1. Provide openings to accommodate instrumentation, thermometers, smoke detectors, controllers and miscellaneous components. Insert through airtight rubber grommets.

2. Where openings are provided in insulated ductwork for insertion of instruments install insulation material inside metal ring for use as a plug.

3. At fire dampers allow adequate length of duct to install access door.

M. Rectangular duct joints:

1. In medium pressure ductwork transverse joints shall be Ductmate. In low pressure ductwork transverse joints shall be Ductmate except that slip and drive may be used at contractor's option for ducts less than 24 inches longest side.

2. Longitudinal seams shall be Pittsburge type. Snaplock shall not be allowed.

N. Connections to air distribution (grilles, registers and diffusers) shall be by full radius elbow or by a straight duct connection for one duct diameter or greater.

1. Where space is tight use side inlet plenums (cans) fabricated of minimum 24 gauge galvanized sheet metal, at least as tall as the connecting duct, with turning vanes.

O. Duct hangers and supports

1. Support horizontal ducts with hangers of size and spacing per SMACNA HVAC Duct Construction Standards with attachments to suit structure type and seismic restraints where required.

P. Volume and Dampers shall be provided at locations shown on the drawings. In addition, volume dampers shall be provided for each air terminal per the following requirements;

1. Volume dampers shall be installed as far away from air outlets as functionally reasonable to avoid noise in the occupied spaces.

2. Provide also in wyes and spin-ins to outlets whether shown on drawings or not, except:

a. Where dampers are not shown above inaccessible ceilings.

b. To sidewall outlets in exposed ducts (opposed blade dampers in outlets shall be provided).

END OF SECTION

233116.16 - PHENOLIC DUCTS

SECTION 233116.16
PHENOLIC DUCTS

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes:
1. Non-Fibrous, Closed Cell, Phenolic Ductwork for exterior applications
B. This section does not include:
1. Air passages rated over a continuous internal static pressure of 10" w.g. positive, 10" negative, or with test pressure rating over: 10" w.g. startup and 10" w.g. negative (as documented on product labeling).

1.4 SPECIFICATION COMPLIANCE
A. Duct Leakage Class, follow SMACNA Leakage Class 3 or less.
B. Phenolic duct shall incorporate a fortified inner liner compliant to UL (C-UL) 181 Standard for Safety Listed, Class 1 system, with included testing and passing the following:
1. Test for Surface Burning Characteristics
2. Flame Penetration Test
3. Burning Test
4. Mold Growth and Humidity Test
5. Low Temperature Test and High Temperature Test
6. Puncture Test
7. Static Load Test
8. Impact Test
9. Pressure Test and Collapse (negative pressure) Test
10. High Temperature and Humidity for 90 days
11. Cone Calorimeter
12. ASTM E2257 Standard Test Method for Room Fire Test of Wall and Ceiling Materials and Assemblies
13. ASTM E 84 tested, Tunnel Test, Does not exceed 25 flame spread, 50 smoke developed.
14. DW144, Class B
15. NRTL product approval, (Subpart S of 29 CFR Part 1910, OSHA)
16. ASTM C 423 noise reduction
17. ASTM E 96/E 96M Procedure A for permeability
18. ASTM C 1071 for erosion
19. ASTM C 518: 2004, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
20. UL 723, Test for Surface Burning Characteristics of Building Materials
21. NFPA Compliance:
a. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems"
b. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems"
c. NFPA 255, "Standard Method of Test of Surface Burning Characteristics of Building Materials

B. Phenolic duct outer shell shall be a UV stable 1000 micron high impact resistant titanium infused vinyl with included testing as following;
1. UL-94 Flammability V-0
2. ASTM D-638 Tensile Strength of 6250 psi
3. ASTM D-790 Flexible Strength of 11,000 psi
4. ASTM D-4226 Drop Impact Resistance
5. ASTM D-4216 Cell Classification

1.5 PRODUCT DELIVERY AND STORAGE
A. Prevent objectionable aesthetic damage to the outer surface of duct segments during transport and storage.
B. Store duct segments under cover and protect from excessive moisture prior to installation.

PART 2 - PRODUCTS

2.1 PHENOLIC RECTANGULAR DUCT AND FITTINGS
A. The panel shall be manufactured of closed cell rigid thermoset resin thermally bonded on both sides to a factory applied .001" (25 micron) aluminum foil facing reinforced with a fiberglass scrim. An added UV stable, IR reflective 1000-micron high impact resistant titanium infused vinyl is factory bonded using a full lamination process. The lamination process shall permanently bond the vinyl clad to the outer surfaces of the phenolic foam panel to provide a zero-permeability water tight barrier and to form a structurally insulated panel (SIP) in which to form duct segments. Processes that do not employ a full lamination process are not acceptable. Self-applied adhesives such as tapes, caulks or cladding that incorporate pressure sensitive or spray adhesives are not acceptable.
B. The thermal conductivity shall be no greater than 0.146BTU in/Hr ft2°F (.018W/m°C), the thermal conductivity shall be no greater than 0.146BTU in/Hr ft2°F (.018W/m°C)
C. The density of the panel foam shall not be less than 3.5 pcf (56 Kg/m3) with a minimum compressive strength of 28 psi (.2 MPa).
D. The standard panel is (31 mm) thickness panel with R-8.1 (1.5 RSI) shall be utilized unless indicated otherwise on the print.
1. Maximum Temperature: Continuous rating of 185 degrees F (70 deg C) inside ducts or ambient temperature surrounding ducts.
2. Maximum Thermal Conductivity: 0.146 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
3. Permeability: 0.00 perms maximum when tested according to ASTM E 96/E 96M, Procedure A.
4. Antimicrobial Agent: Additive for antimicrobial shall not be used but instead, raw product must pass UL bacteria growth testing.
5. Noise-Reduction Coefficient: 0.05 minimum when tested according to ASTM C 423, Mounting A.
6. Required Markings: All interior duct liner shall bear UL label and other markings required by UL 181 on each full sheet of duct panel; UL ratings for internal closure materials.
7. All insulation materials shall be closed cell with a closed cell content of >90%.

8. R-value:
a. 1 3/16 inch (31 mm) Thick Panel: 8.1 R
b. 2 3/8" Double wall (62 mm) Thick Panel: 16.2 R
9. Pressure Class design must be specified prior to fabrication.
F. Closure Materials:
1. V-Groove Adhesive: Silicone (interior only).
2. UV stable 1000 micron high impact resistant titanium infused vinyl (exterior).
a. Factory manufactured seamless corners for zero perms.
b. Cohesive bonded over-lap at corner seam covers for zero perms.
c. Water resistant titanium infused welded vinyl seams.
d. Mold and mildew resistant.
3. Polymeric Sealing System:
a. Structural Membrane: Aluminum scrim with woven glass fiber with UV stable vinyl clad applied
b. Minimum Seam Cover Width: 2 7/8" inches (75 mm)
c. Sealant: Low VOC.
d. Color: White (colors, matched by architect optional).
e. Water resistant.
f. Mold and mildew resistant.
4. Duct Connectors.
a. Factory manufactured galvanized 4-bolt flange.
G. Outdoor Cladding
1. Outdoor Installations: Duct segments shall incorporate UV stable 1000 micron high impact resistant titanium infused vinyl which is introduced during the manufacturing process.

H. Flange coverings
1. Flanges are field sealed airtight before flange covers are installed. Flange covering consists of the following:
1. Foam tape insulation with molded 39 mil covers.
2. Air gap (heating only application) with molded 39 mil covers.
J. Reinforcement
1. Product shall provide designed and built with adequate reinforcement to both; withstand air pressure forces from within the duct from blower pressure and shall be built to handle expected snow load for the location where the product is being installed. Product will employ factory-installed internal reinforcement system when both specified static pressure and duct sizes dictate the need.
I. Weight
1. Product shall provide low weight stresses on the building framing and support members. Assembled product shall have a weight of 0.86 lbs. per square foot to maximum weight of 2.7 lbs. per square foot (depending on R-value and reinforcement requirement). Hangers and tie-downs are to be detailed in the manufacturer Installation Manual for review prior to installation but not exceeding 13' for duct girth <84" and 8' for duct girth >85" between hangers and designed to carry the weight and wind load of the ductwork.

PART 3 - EXECUTION

3.1 Shop Fabrication
A. Certification:
1. Ducts shall be detailed and fully factory manufactured by the manufacturer's authorized facility system. All fabrication labor will be certified "yellow label" building trade professionals, compliant to SMWIA and SMACNA labor guidelines (work preservation observed).
B. Fabrication:
1. Fabricated joints, seams, transitions, reinforcement, elbows, branch connections, access doors and panels, and damage repairs according to manufacturer's written and detailed instructions.
2. Fabricated 90-degree mitered elbows to include turning vanes.
3. Fabricated duct segments in accordance with manufacturer's written details.
4. Duct Fittings shall include 6 inches of connecting material, as measured, from last bend line to the end of the duct. Connections on machine manufactured duct may be 4 inches.
5. Fabricated duct segments utilizing v-groove method of fabrication. Factory welded or cohesively bonded seams will apply to fully manufactured ductwork and fittings. Internal seams will be supplied with an unbroken layer of low VOC silicone or bonding (for paint shop applications). Each duct segment will be factory supplied with either aluminum grip pro-file or pre-insulated duct connectors in accordance with manufacturer's detailed submittal guide. Applied duct reinforcement to protect against side deformation from both positive and negative pressure per manufacturer's design guide based on specified ductwork size and system pressure.
6. Designed and fabricated duct segments and fittings will be in accordance with "SMACNA Phenolic Duct Construction Standards" latest edition.
7. Both positive and negative ductwork and fittings shall be constructed to incorporate a UL Listed as a Class 1 air duct to Standard for Safety UL 181 liner with an exterior clad for permanent protection against water intrusion.
8. Duct shall be constructed to exceed requirements for snow and wind loads.
3.2 DUCT INSTALLATION
A. Duct segments shall be installed per the manufacturer's Installation Manual by competent HVAC installers.
B. Install ducts and fittings to comply with manufacturer's installation instructions as follows:
1. Install ducts with fewest possible joints.
2. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
3. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
4. Protect duct interiors from the moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."
5. Use prescribed duct support spacing as described in this specification and manufacturer's recommendations.
C. Air Leakage: Duct air leakage rates to be in compliance with "SMACNA HVAC Air Duct Leakage Test Manual" latest version per applicable leakage class based on pressure.
3.3 HANGER AND SUPPORT INSTALLATION
A. Contractor to ensure that the ductwork system is properly and adequately supported per the manufacturer's Installation Manual.
1. Ensure that the chosen method is compatible with the specific ductwork system requirements per manufacturer's installation detail drawings. Pre-installation should be provided prior to work commencement by installing contractor for approval.
2. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
B. Supports on straight runs of ductwork shall be positioned at centers not exceeding 13 feet (3.96 m) for duct sections when fabricated in 13 foot (3.96 m) lengths with duct girth less than 84". Larger duct sizes and short segments with duct girth greater than 84" are to be supported at 8 foot centers or less, in accordance with the manufacturer's Installation Manual provided prior to work commencement.
C. Ductwork shall be supported at changes of direction, at branch duct connections, tee fittings, parallel under turning vanes and all duct accessories such as dampers, etc.
D. The load of such accessories to the ductwork shall be neutralized by the accessory support.

3.4 FIELD QUALITY CONTROL
A. Inspection: Arrange for manufacturer's representative to inspect completed installation and provide written report that installation complies with manufacturer's written instructions.
1. Remove and replace duct system where inspection indicates that it does not comply with specified requirements.
B. Perform additional testing and inspecting, at the Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

3.5 DUCT SCHEDULE
A. Outdoor Ducts and Fittings:
1. Rectangular Ducts and Fittings:
a. Minimum Panel Thickness: 31 mm
b. Cladding: minimum 0.038 inch

233713 - DIFFUSERS/REGISTERS

SECTION 23 37 13
DIFFUSERS, REGISTERS AND GRILLES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide all air outlets, inlets, grilles, registers and diffusers except where integral with manufactured piece of equipment. Outlets and inlets shall have, as a minimum, throw and noise criteria ratings for each size device as listed in manufacturers current data, rated as required by the applicable publications and standards.

PART 2 - PRODUCTS

2.01 GENERAL

A. Manufacturer shall examine and approve of application of each item of air distribution.

B. Noise level at design capabilities: no larger than diffuser selections shown on drawings.

C. Volume dampers:

1. Do not provide dampers built into air distribution or directly attached to air distribution unless specifically called out on drawings.

D. Air distribution frame shall be suitable for the ceiling or wall construction indicated.

E. Match finish color sample as directed by the Owner's Representative.

2.02 AIR OUTLETS AND INLETS

A. Materials:

1. Steel or aluminum unless specifically indicated within the documents. Provide manufacturer's standard gasket.

B. Air Supply Outlets:

1. Ceiling Diffusers: Suitable for surface mounting, exposed T_bar or special tile ceilings, baked enamel white finish, square or round neck connection as shown on the drawings. Provide plaster frame for units in plaster ceilings.

a. Square, louver, fully adjustable pattern: Round neck, surface mounting unless shown otherwise on the drawings. Provide equalizing or control grid and volume control damper.

b. Louver face type: Square or rectangular, removable core for one, two, three or four-way directional pattern. Provide equalizing or control grid and opposed blade damper.

2. Supply Registers: Double deflection type with horizontal face bars and opposed blade damper with removable key operator.

a. Finish: Off white baked enamel for ceiling mounted units. Wall units shall have a prime coat for field painting, or shall be extruded with manufacturer's standard finish.

3. Supply Grilles: Same as registers but without the opposed blade damper.

C. Return and Exhaust Registers and Grilles: Provide opposed blade damper without removable key operator for registers.

1. Finish: Off-white baked enamel for ceiling mounted units. Wall units shall have a prime coat for field painting, or shall be extruded aluminum with manufacturer's standard aluminum finish.

2. Standard Type: Fixed horizontal face bars set at 30 to 45 degrees, approximately 1_1/4 inch margin.

3. Egg Crate Grilles: Aluminum or Painted Steel 1/2 by 1/2 by 1/2 inch grid providing 90% free area.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install air distribution in accordance with manufacturers written installation instructions.

B. Return and exhaust grilles: install with blades oriented to prevent sight through outlets.

C. Air distribution cans visible through grilles painted flat black.

3.02 MOUNTING AND ALIGNMENT

A. All air distribution shall be secured to building:

1. Ceiling distribution shall be secured to prevent falling from ceiling during construction or service with minimum of two 16-gauge ceiling wires, two 22-gauge by 1 inch galvanized sheet metal strap or two #10 sheet metal screws.

B. Adjust distribution throw patterns:

1. As shown on drawings.

END OF SECTION

238000 - HVAC EQUIPMENT

SECTION 23 80 00
DECENTRALIZED HVAC EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section covers the furnishing and installation of Heating, Ventilating and Air Conditioning (HVAC) equipment as indicated on the contract drawings, schedules and as specified herein.

1.02 SUBMITTALS

A. Manufacturer's literature and data:

1. Sufficient information, including capacities, pressure drops and piping connections clearly presented, shall be included to determine compliance with drawings and specifications for units noted below:

a. Unitary air conditioners:

1. Split systems

2. Rooftop units

3. Gas fired furnaces

2. Unit Dimensions required clearances, operating weights accessories and start-up instructions.

3. Electrical requirements, wiring diagrams, interlocking and control wiring showing factory installed and portions to be field installed.

4. Mounting and flashing of the roof curb to the roofing structure with coordinating requirements for the roof membrane system.

B. Operating and Maintenance Manual: Submit three copies of Operating and Maintenance manual to Resident Engineer three weeks prior to final inspection.

PART 2 - PRODUCTS

2.01 EQUIPMENT - REFER TO SCHEDULES.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Roof Curb: Install where indicated on the Drawings, level and secure, according to ARI Guideline B. Secure rooftop units to upper curb rail, and secure curb base to roof framing or concrete base with anchor bolts.

B. Rooftop Unit Support: Install unit level on structural curbs, unless otherwise indicated on the Drawings. Coordinate wall penetrations and flashing with wall construction. Secure rooftop units to structural support with anchor bolts.

C. Install units level and plumb maintaining manufacturer's recommended clearances and tolerances.

D. Install ground-mounting, compressor-condenser components on 4-inch thick, reinforced concrete base; 4 inches larger on each side than unit.

E. Install seismic restraints.

F. Install and connect pre-charged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

G. Install wall sleeves in finished wall assembly and weatherproof. Install and anchor wall sleeves to withstand, without damage seismic forces as required by code.

3.02 CONNECTIONS

A. Verify condensate drainage requirements.

B. Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain or area drain or as indicated on the Drawings.

C. Install ducts to termination at top of roof curb. Cut roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.

D. Connect refrigerant piping to coils with shutoff valves on the suction and liquid lines at the coil and a union or flange at each connection at the coil and condenser.

E. Install ducts to the units with flexible duct connections.

END OF SECTION

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PROJECT TITLE
Sonoma Veteran's Memorial Hall HVAC Tenant Improvement
126 1st Street West
Sonoma, CA 95476

APPROVALS

#	REVISION	DATE
1	PLAN CHECK RESPONSE	05/21/2024

DRAWING TITLE
HVAC SPECIFICATIONS

ISSUE DATE	10/23/2023
ISSUE TYPE	OWNER REVIEW
DRAWN BY	RLY
CHECKED BY	MJT/JMT
SCALE	AS NOTED
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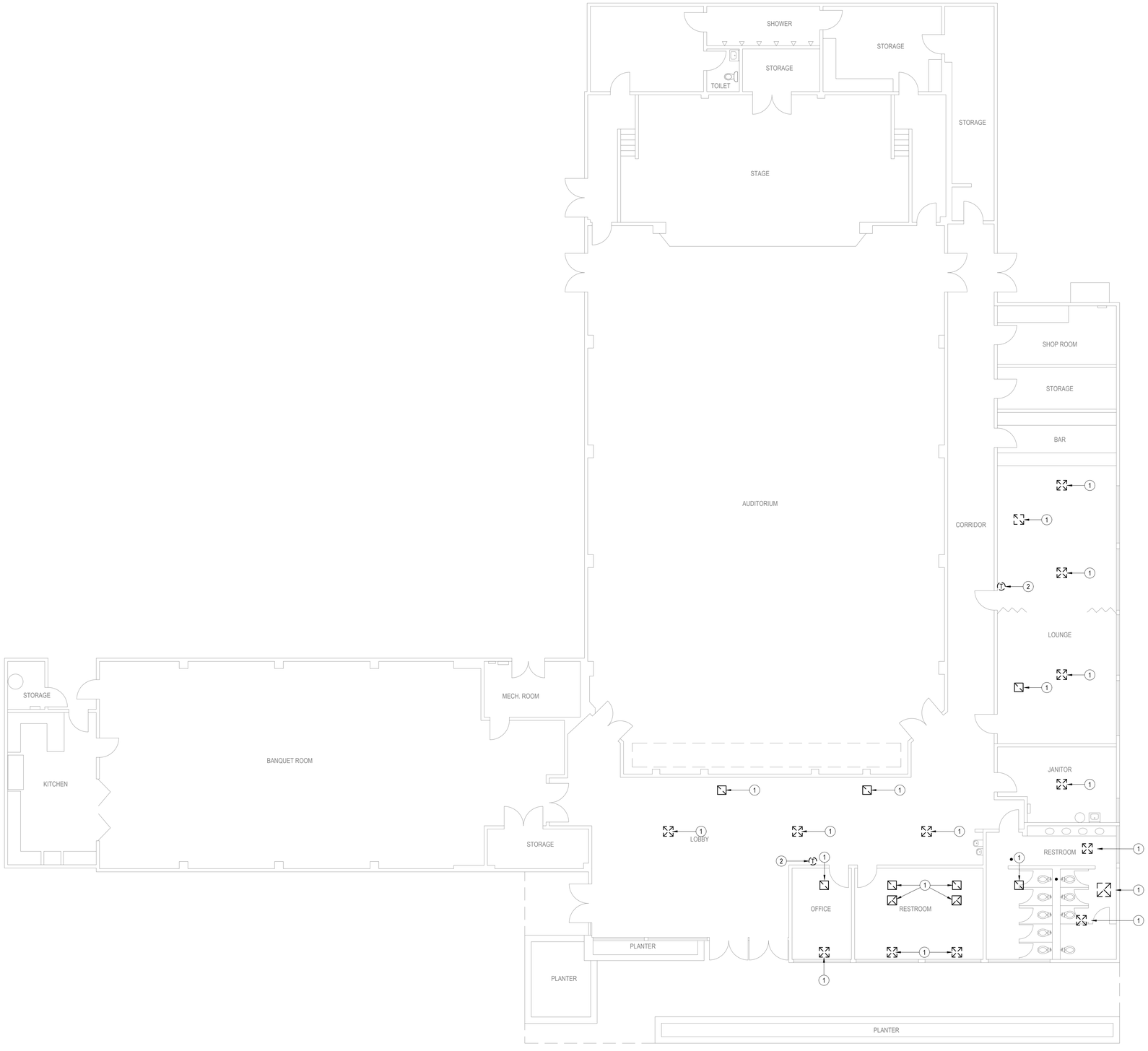
M0.03



1 HVAC DEMOLITION PLAN - GROUND FLOOR

SCALE: 1/4"=1'-0"

HVAC SHEET NOTES - DEMOLITION

NOTE: NOT ALL NOTES USED ON EACH SHEET

1. CEILING AIR TERMINAL - DISCONNECT AND REMOVE EXISTING SUPPLY DIFFUSER / RETURN GRILLE / EXHAUST GRILLE, AND ASSOCIATED DUCTWORK ABOVE CEILING. PATCH AND REPAIR CEILING TO MATCH EXISTING ADJACENT SURFACES.
2. FURNACE AIR HANDLER - DISCONNECT AND REMOVE EXISTING ROOF-MOUNTED AIR HANDLING UNIT, ASSOCIATED DUCT FURNACES, AND ROOF-MOUNTED DUCTWORK. DISCONNECT AND REMOVE EXISTING ROOF CURBS, PATCH, REINSULATE, AND SEAL ROOF PENETRATIONS TO MATCH EXISTING ADJACENT SURFACES. DISCONNECT AND REMOVE EXISTING THERMOSTAT AND CONTROL WIRING. REMOVE EXISTING GAS PIPING TO LOCAL ROOF PENETRATION AT CAP.
3. EXISTING DUCT/CONDUIT ROOF SUPPORT RAILS ARE TO REMAIN AND BE RE-USED. PROVIDE REPLACEMENT SUPPORT RAIL SHEETMETAL CAPS FOR EXISTING DAMAGED RAILS OR RAILS DAMAGED IN REMOVAL OF DUCT SYSTEM.
4. EXHAUST FAN - EXISTING FANS TO REMAIN AND BE RE-USED.
5. EXHAUST FAN (RESTROOM) - DISCONNECT AND REMOVE EXISTING ROOF-MOUNTED RESTROOM EXHAUST FANS AND ASSOCIATED DUCTWORK. DISCONNECT AND REMOVE EXISTING ROOF CURB, PATCH REINSULATE AND SEAL ROOF OPENINGS TO MATCH EXISTING ADJACENT SURFACES.
6. EXHAUST FAN (RESTROOM) - DISCONNECT AND REMOVE EXISTING ROOF-MOUNTED RESTROOM EXHAUST FANS AND ASSOCIATED DUCTWORK. DISCONNECT AND REMOVE EXISTING ROOF CURB, EXISTING ROOF OPENING TO BE RE-USED IN NEW FAN INSTALLATION.
7. RELIEF FAN (LOUNGE) - DISCONNECT AND REMOVE EXISTING RELIEF FAN AND ASSOCIATED DUCTWORK AND AIR TERMINALS. DISCONNECT AND REMOVE EXISTING ROOF CURB, PATCH REINSULATE AND SEAL ROOF OPENINGS TO MATCH EXISTING ADJACENT SURFACES.
8. DUCT PENETRATION - EXISTING DUCT CURBS TO REMAIN AND BE RE-USED. REMOVE SHEETMETAL CAPS AS REQUIRED FOR NEW DUCT SIZES AND REPLACE DUCT CAPS. SEAL WEATHERTIGHT, REFER TO DETAIL.

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HVAC DEMOLITION PLAN - GROUND FLOOR

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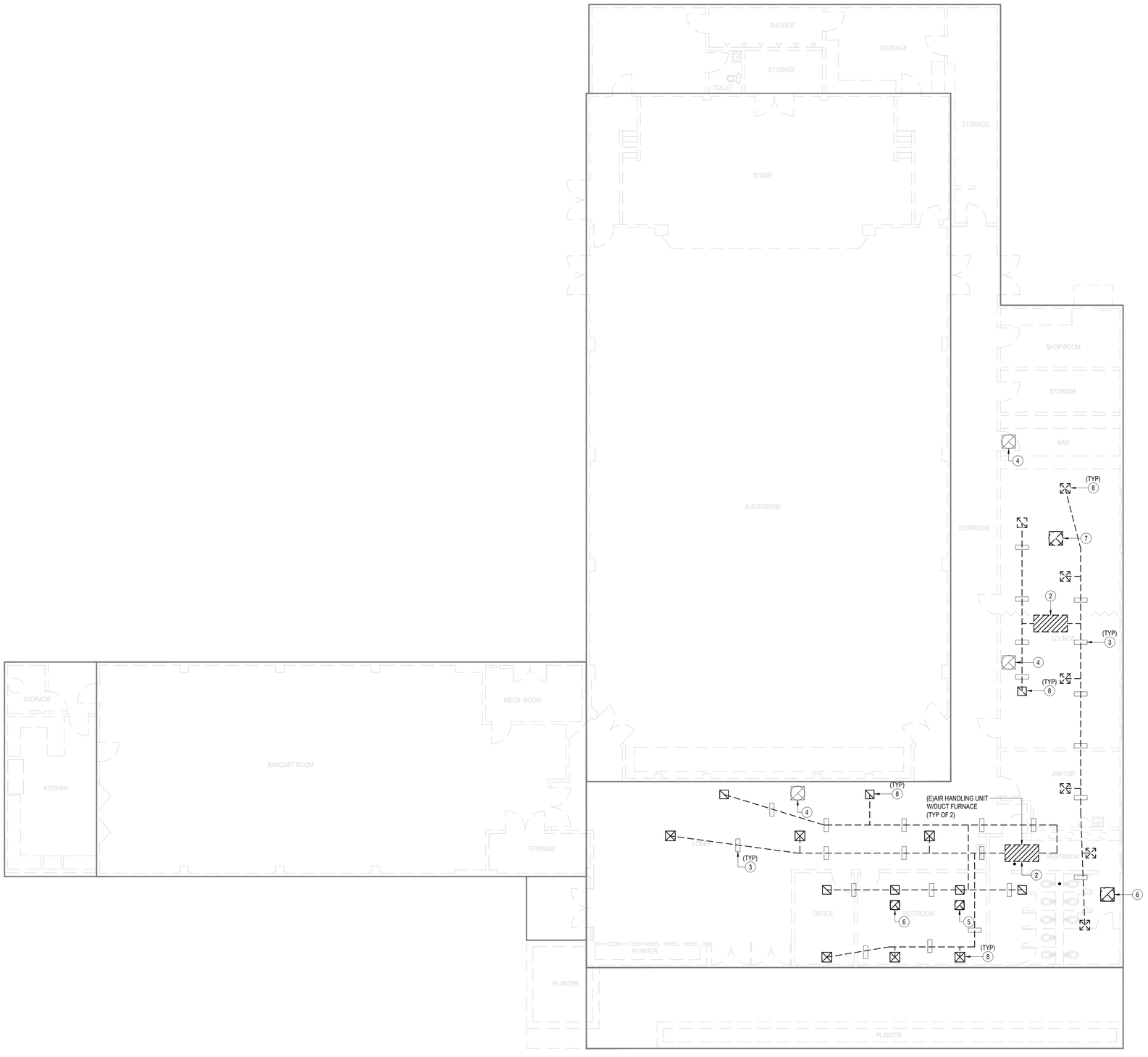
M1.01



1 HVAC DEMOLITION PLAN - ROOF

SCALE: 1/4"=1'-0"

HVAC SHEET NOTES - DEMOLITION

NOTE: NOT ALL NOTES USED ON EACH SHEET

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HVAC DEMOLITION PLAN - ROOF

ISSUE DATE	10/23/2023
ISSUE TYPE	OWNER REVIEW
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CHECKED BY	MJT/JMT
SCALE	AS NOTED
PROJECT No.	1817.0.00

DRAWING

M1.02

1 HVAC PLAN - GROUND FLOOR

SCALE: 1/4"=1'-0"

HVAC SHEET NOTES

1. EXTEND PVC PLUMBING VENT, FULL SIZE, BEYOND 10'-0" RADIUS OF MECHANICAL AIR INTAKE. PROVIDE PIPE SUPPORTS AT 6'-0" SPACING AS REQUIRED FOR EXTENSION.
2. 3/4" PVC CONDENSATE TO LOCAL ROOF DRAIN. PROVIDE MINIMUM 1/4"/FT SLOPE ON DRAIN PIPING.
3. CONNECT TO (E) DUCT STUB ON ROOF. PROVIDE WITH ANCILLARY FITTINGS TO MAKE FINAL CONNECTION. FLASH AND SEAL WEATHERTIGHT TO MATCH SURROUNDING CONDITIONS.
4. ROUTE DUCTWORK ON ROOF, TYP. UON.

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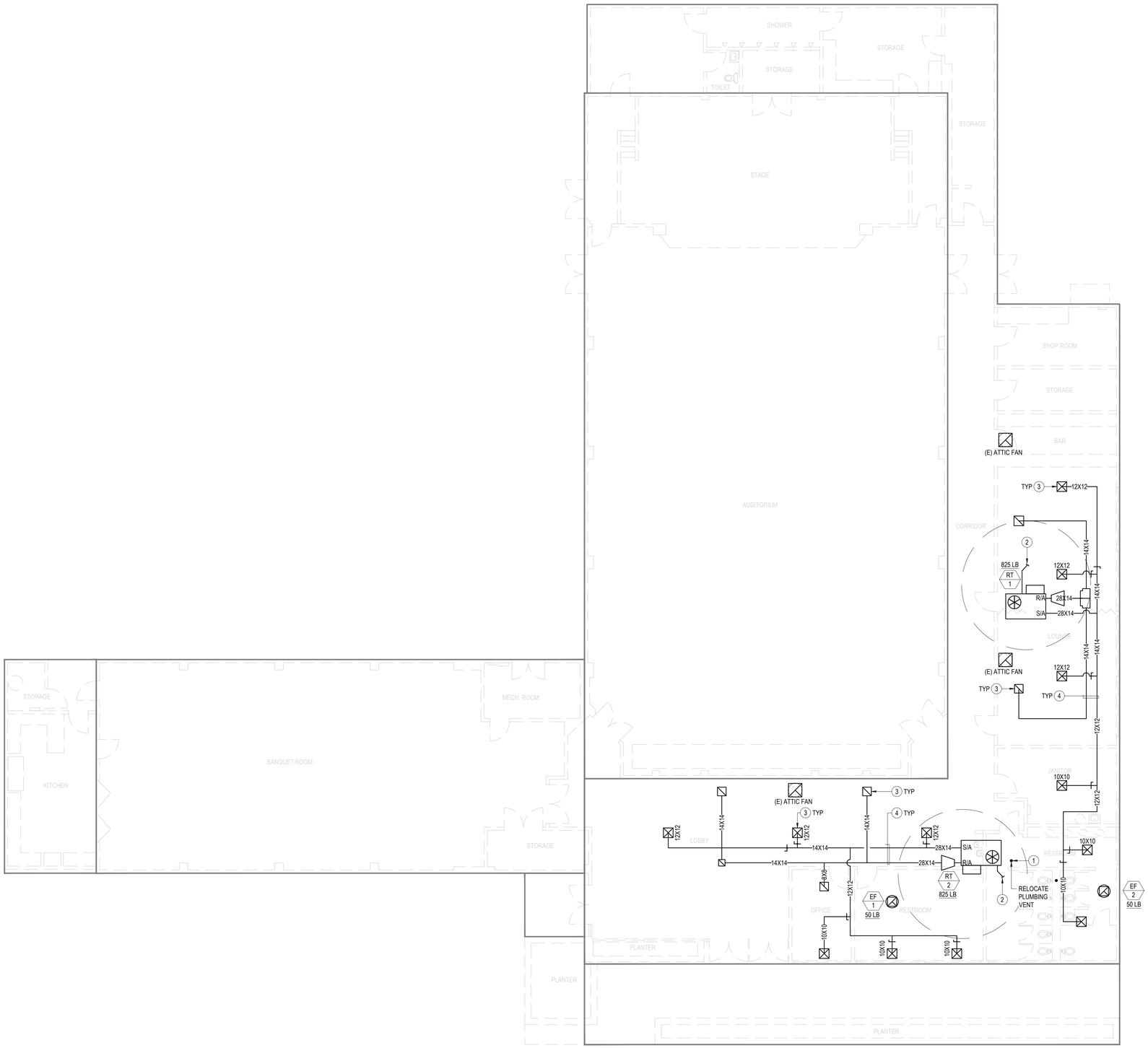
HVAC PLAN - GROUND FLOOR

ISSUE DATE	10/23/2023
ISSUE TYPE	OWNER REVIEW
DRAWN BY	RLY
CHECKED BY	MJT/JMT
SCALE	AS NOTED
PROJECT No.	1817.0.00

DRAWING

M1.03



1 HVAC PLAN - ROOF

SCALE: 1/4"=1'-0"

HVAC SHEET NOTES

1. EXTEND PVC PLUMBING VENT, FULL SIZE, BEYOND 10'-0" RADIUS OF MECHANICAL AIR INTAKE. PROVIDE PIPE SUPPORTS AT 6'-0" SPACING AS REQUIRED FOR EXTENSION.
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HVAC PLAN - ROOF

ISSUE DATE	10/23/2023
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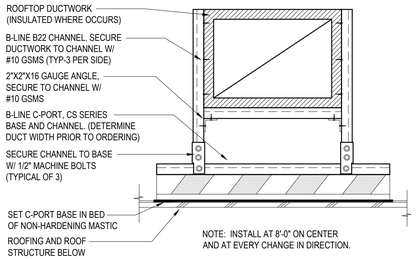
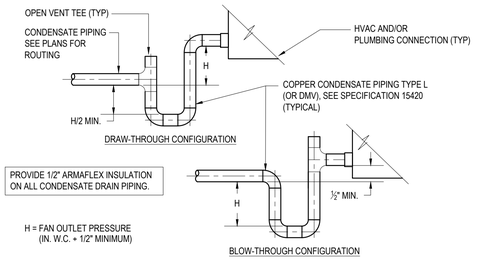
M1.04



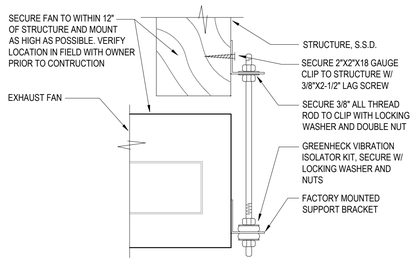
5 DUCT SUPPORT ON ROOF

SCALE: NONE



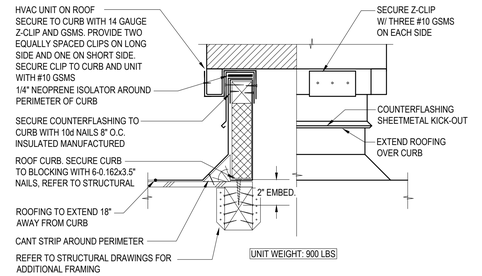
1 CONDENSATE DRAIN CONNECTION

SCALE: NONE



6 EXHAUST FAN MOUNTING DETAIL

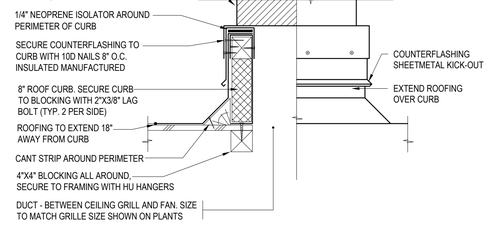
SCALE: NONE



2 ROOFTOP HVAC UNIT MOUNTING DETAIL

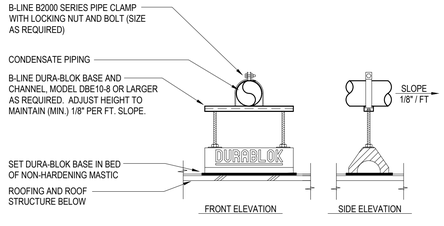
SCALE: NONE

NOTE: REFER TO STRUCTURAL PLANS FOR FULL DETAILING.



3 ROOFTOP EXHAUST FAN MOUNTING DETAIL

SCALE: NONE



NOTES: 1. INSTALL SUPPORTS AT MINIMUM 8'-0" O.C. AND AT EVERY CHANGE IN DIRECTION

4 CONDENSATE PIPE SUPPORT ON ROOF

SCALE: NONE

THIS METHOD OF CONSTRUCTION UTILIZES MATERIAL APPROVED BY THE U.S. GREEN BUILDING COUNCIL FOR LEEDS CREDITS

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HVAC DETAILS

ISSUE DATE	10/23/2023
ISSUE TYPE	OWNER REVIEW
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SCALE	AS NOTED
PROJECT No.	1817.0.00

DRAWING

M5.01

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters and DOAS systems)

01	02	03	04	05	06	07	08	09	10	11
Name or Item Tag	Equipment Category per Tables 110.2, 140.4(a)2 and 170.2(c)3aii	Equipment Type per Tables 110.2 and Title 20	Smallest Size Available[1] 140.4(a) and 170.2(c)1	Equipment Sizing per Mechanical Schedule (kBtu/h) 140.4(a&b), 170.2(c)1 & 170.2(c)2						
				Heating Output[1,3]			Cooling Output[1,2]		Load Calculations[3,4]	
				Per Design (kBtu/h)	Rated (kBtu/h)	Supp. Heating Output (kBtu/h)	Sensible Per Design (kBtu/h)	Rated (kBtu/h)	Total Heating Load (kBtu/h)	Total Sensible Cooling Load (kBtu/h)
Lounge	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	Yes	63.2	65	26.96	66.13	55	168.95	114.81
Front	Unitary Heat Pumps	Air-cooled, pkg (3 phase)	Yes	63.2	65	26.96	67.54	55	159.21	100.79

[1] FOOTNOTES: Equipment shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per 140.4(a) and 170.2(c)1. Healthcare facilities are exempted.
[2] It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.
[3] If equipment is heating only, leave cooling output and load blank. If equipment is cooling only, leave heating output and load blank.
[4] Authority Having Jurisdiction may ask for load calculations used for compliance per 140.4(b) and 170.2(c).

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP), DX-DOAS and Dual Fuel Heat Pumps)

01	02	03	04	05	06	07	08	09
Name or Item Tag	Size Category (Btu/h)	Heating Mode				Cooling Mode		
		Rating Condition (°F)	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency
Lounge	>=65,000 and <135,000		COP	3.4	3.6	EER IEER	11 14.1	11.2 15
Front	>=65,000 and <135,000		COP	3.4	3.6	EER IEER	11 14.1	11.2 15

H. EXHAUST AIR HEAT RECOVERY 140.4(q), 170.2(c)4O

Fan System Name	Qty	Hours of Operation per Year	Design Supply Airflow Rate	Outdoor Airflow	% Outdoor Air at Full Design Airflow	Exemptions to Exhaust Air Heat Recovery Requirement per 140.4(q) & 170.2(c)4O	Exhaust Air Heat Recovery 140.4(q) & 170.2(c)4O	Type Of Heat Recovery Rating	Required Recovery Ratio	Energy Recovery Bypass

Fan Energy Index (FEI)

01	02	03
Name or Item Tag	FEI Exception	FEI

I. SYSTEM CONTROLS

This table is used to demonstrate compliance with mandatory controls in 110.2 and 120.2 and prescriptive controls in 140.4(f) and (n), 170.2(c)4D 170.2(c)4L or requirements in 141.0(b)2E 180.2(b)2 for altered space conditioning systems.

01	02	03	04	05	06	07	08	09
System Name	System Zoning	Conditioned Floor Area Being Served (ft²)	Thermostats 110.2(b) & (c)[1], 120.2(a) 160.3(a)2A or 141.0(b)2E & 180.2(b)2	Shut-Off Controls 120.2(e) & 160.3(a)2D	Isolation Zone Controls 120.2(g) & 160.3(a)2F	Demand Response 110.12 120.2(b) & 160.3(a)2B	Supply Air Temp. Reset 140.4(f) & 170.2(c)4D	Window Interlocks per 140.4(n) & 170.2(c)4D
Lounge	Single zone	<= 25,000 ft²	Setback	Auto Timer Switch	4 Hour Timer	DR Tstat per 110.12	Included	NA: No thermostatic control
Front	Single zone	<= 25,000 ft²	Setback	Auto Timer Switch	4 Hour Timer	EMCS	Included	NA: HRR dwelling unit

[1] FOOTNOTES: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves are not required to have setback thermostats.

J. VENTILATION AND INDOOR AIR QUALITY

Men's Restroom	Toilet, public	280	9		0	630	630	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				494	18	Ventilation for this System Complies?		Yes

[1] FOOTNOTES: System CFM should include both mechanical and natural ventilation for the zone/system
[2] Air filtration requirements apply to the following three system types per 120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.
[3] Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.
[4] See Standards Tables 120.1-A and 120.1-B.
[5] For lecture halls with fixed seating, the expected number of occupants shall be determined In accordance with the California Building Code.
[6] 120.2(e)3 requires systems serving rooms that are required by 130.1(c) to have lighting occupancy sensing controls to also have occupancy sensing zone controls for ventilation. Examples of spaces which require lighting occupancy sensors include offices 250ft² or smaller, multipurpose rooms less than 1,000 ft², classrooms, conference rooms, restrooms, aisles and open areas in warehouses, library book stack aisles, corridors, stairwells, parking garages, and loading and unloading zones, unless excepted by 130.1(c).

K. TERMINAL BOX CONTROLS

This section does not apply to this project.

L. DISTRIBUTION (DUCTWORK and PIPING)

This table is used to show compliance with mandatory pipe insulation requirements found in 120.3 and mandatory requirements found in 120.4(g) for duct sealing.

01	☐	Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service. Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall have a Class I or Class II vapor retarder. All penetrations and joints of which shall be sealed.

Duct Leakage Testing

The answers to the questions below apply to the following duct systems:	Lounge	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	No

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with mechanical requirements. This table is not editable by the user. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D., or the table indicated as not compliant for guidance.

01		02		03		04		05		06		07		08	09
System Summary 110.1, 110.2, 140.4, 170.2(c)	AND	Pumps 140.4(k), 170.2(c)4I	AND	Fans/ Economizers 140.4(c), 140.4(e), 170.2(c)	AND	System Controls 110.2, 120.2, 140.4(f), 170.2(c)	AND	Ventilation 120.1, 160.2	AND	Terminal Box Controls 140.4(d), 170.2(c)4B	AND	Distribution 120.3, 140.4(l), 160.2, 160.3	AND	Cooling Towers 110.2(e)2	Compliance Results
(See Table F)		(See Table G)		(See Table H)		(See Table I)		(See Table J)		(See Table K)		(See Table L)		(See Table M)	
Yes	AND		AND	Yes	AND	Yes	AND	Yes	AND		AND	Yes	AND		COMPLIES
Mandatory Measures Compliance [See Table Q for Details]														COMPLIES	

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Space Conditioning System Information

01	02	03	04	05	06
System Name	Quantity	System Serving	System Status	Space Type	Utilizing Recovered Heat
Lounge	1	Single zone	New/ Addition		☐
Front	1	Single zone	New/ Addition		☐

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	Front	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,400	Site Elevation	70	Economizer	Fixed Temperature
01	02	03	04			05		06	07	08	09			10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	2,400		557		Manufacturer provided		1.3
			MERV 13-16 Filter upstream of thermal conditioning equipment	2,400		334				
			Hydronic/DX cooling coil or heat pump coil	2,400		334				
			Economizer Return Damper	2,400		110				
Supply Fan Base Allowance (kW)			Exhaust/Return/Relief/Transfer Fan Base Allowance(kW)				Fan System Allowance (kW)[3]	1.33	Fan System Electrical Output (kW)	1.3

[1] FOOTNOTES: Fans serving spaces with design background noise goals below NC35
[2] Low-turndown single-zone VAV fan system must be capable of and configured to reduce airflow to 50 percent of design airflow and use no more than 30 percent of the design wattage at that airflow. No more than 10 percent of the design load served by the equipment shall have fixed loads.
[3] Fan system allowance includes fan system base allowance.
[4] Filter pressure loss can only be counted once per fan system.
[5] Complex Fan System means a fan system that combines a single cabinet fan system with other supply fans, exhaust fans, or both.
[6] Computer room economizers must meet requirements of 140.9(a) and will be documented on the NRCC-PRC-E document..

H. EXHAUST AIR HEAT RECOVERY 140.4(q), 170.2(c)4O

01	02	03	04	05	06	07	08	09	10	11

J. VENTILATION AND INDOOR AIR QUALITY

Women's Restroom	Toilet, public	410	9		0	630	630	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				472	18	Ventilation for this System Complies?		Yes

04		05			06			07
System Name	Front	System Design OA CFM Airflow[1]	1124		System Design Transfer Air CFM		0	Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)2[2]
								Provided
08	09	10	11	12	13	14	15	16

Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[5] 160.2(c)5D 160.2(c)5E 160.2(c)5D	
	Occupancy Type[4]	Conditioned Floor Area (ft²)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM		
Office	Office space	130			19.5	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
Lobby	Lobbies	530			265	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
Corridor	Corridor	1400			210	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type

This document is used to demonstrate compliance for mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, or 141.0(b)2 for alterations.

A. GENERAL INFORMATION

01	Project Location (city)	Sonoma	04	Total Conditioned Floor Area	3895
02	Climate Zone	2	05	Total Unconditioned Floor Area	0
03	Occupancy Types Within Project:		06	# of Stories (Habitable Above Grade)	1

● Office ● Support Areas ● All Other Occupancies

B. PROJECT SCOPE

This table Includes mechanical systems or components that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, 170.2(b) or 141.0(b)2 and 180.2(b)2 for alterations.

01	02	03
Air System(s)	Wet System Components	Dry System Components
☒ Heating Air System	☐ Water Economizer	☒ Air Economizer
☒ Cooling Air System	☐ Pumps	☐ Electric Resistance Heat
Mechanical Controls	☐ System Piping	☒ Fan Systems
☒ Mechanical Controls (existing to remain, altered or new)	☐ Cooling Towers	☒ Ductwork (existing to remain, altered or new)
	☐ Chillers	☒ Ventilation
	☐ Boilers	☐ Zonal Systems/ Terminal Boxes

G. PUMPS

This section does not apply to this project.

H. FAN SYSTEMS & AIR ECONOMIZERS

This table is used to demonstrate compliance with prescriptive requirements found in 140.4(c), 140.4(e), 140.4(m), 170.2(c)3, and 170.2(c)4A for fan systems. Fan systems serving only process loads are exempt from these requirements and do not need to be included in Table H.

System Name	Lounge	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,400	Site Elevation	70	Economizer	Fixed Temperature
01	02	03	04			05		06	07	08	09			10	11

Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Allowance: Component Allowance	Allowance: Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	2,400		557		Manufacturer provided		1.3
			MERV 13-16 Filter upstream of thermal conditioning equipment	2,400		334				
			Hydronic/DX cooling coil or heat pump coil	2,400		334				
			Economizer Return Damper	2,400		110				
Supply Fan Base Allowance (kW)			Exhaust/Return/Relief/Transfer Fan Base Allowance(kW)				Fan System Allowance (kW)[3]	1.33	Fan System Electrical Output (kW)	1.3

J. VENTILATION AND INDOOR AIR QUALITY

This table is used to demonstrate compliance with mandatory ventilation requirements in 120.1 120.2(e)3B 140.4(p) and 140.4(q) for all nonresidential and hotel/motel and d:\t24ref\nolink/]160.2, 160.3(a)3D, 170.2(a)4N, 170.2(a)4O for high-rise residential occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflows may be shown on the plans or the calculations can be presented in a spreadsheet.

01	☐	Check the box if the project is showing ventilation calculations on the plans, or attaching the calculations instead of completing this table.
02	☒	Check this box if the project included Nonresidential, Hotel/Motel Spaces or Multifamily Common Use Spaces
	☐	
03	☐	Check the box if the project is using natural ventilation in any nonresidential or hotel/motel spaces to meet required ventilation rates per 120.1(c)2.

Nonresidential and Hotel/ Motel Multifamily Common Use Ventilation Systems

04		05			06			07	
System Name	Lounge	System Design OA CFM Airflow[1]	1152		System Design Transfer Air CFM		0	Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)2[2]	
								Provided	
08	09	10	11	12	13	14	15	16	

Space Name or Item Tag	Mechanical Ventilation Required per 120.1(c)[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D	
	Occupancy Type[4]	Conditioned Floor Area (ft²)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM		
Lounge	Break room	945			472.5	0	0	DCV	Provided per §120.1(d)4
								Occ Sensor	Provided per §120.1(d)5
Janitor	All others	200			0	0	50	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type

15000 INC.
heating, ventilation, air conditioning + plumbing design and engineering
6085 STATE FARM DR. #130 phone: 707.577.0363
ROHNERT PARK, CA 94928 fax: 707.577.0364

REGISTERED PROFESSIONAL ENGINEER MATTHEW J. TORRE M 36958 Exp 9/30/24 MECHANICAL STATE OF CALIFORNIA
SIGNED 5-20-2024

CLIENT
County of Sonoma
2300 County Center Drive, Suite A220
Santa Rosa, CA 95403

PROJECT TITLE
Sonoma Veteran's Memorial Hall HVAC Tenant Improvement
126 1st Street West
Sonoma, CA 95476

APPROVALS

#	REVISION	DATE
1	PLAN CHECK RESPONSE	05/21/2024

DRAWING TITLE
TITLE-24 DOCUMENTATION

ISSUE DATE	10/23/2023
ISSUE TYPE	OWNER REVIEW
DRAWN BY	RLY
CHECKED BY	MJT/JMT
SCALE	AS NOTED
PROJECT No.	1817.0.00

DRAWING
M7.01

Date Stamped: 7/5/2024 Permit: BLD23-7808 Plans Examiner: Paul Marquez
REVIEWED FOR CODE COMPLIANCE - PERMIT SONOMA

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCI/

Form/Title
NRCI-MCH-01-E - Must be submitted for all buildings

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCA/

Form/Title	Systems/Spaces To Be Field Verified
NRCA-MCH-02-A - Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.	50FCQM07; 50FCQM07;
NRCA-MCH-03-A - Constant Volume Single Zone HVAC NOTE: This form does not automatically move to 'Yes'. If Constant Volume Single Zone HVAC Systems are included in the scope, permit applicant should move this form to "Yes".	50FCQM07; 50FCQM07;
NRCA-MCH-05-A - Air Economizer Controls	50FCQM07; 50FCQM07;
NRCA-MCH-06-A Demand Control Ventilation Systems must be submitted for all systems required to employ demand controlled ventilation (refer to 120.1(c)3) can vary outside ventilation flow rates based on maintaining interior carbon dioxide (CO_2) concentration setpoints.	50FCQM07;
NRCA-MCH-11-A Automatic Demand Shed Controls	50FCQM07; 50FCQM07;
NRCA-MCH-12-A FDD for Packaged Direct Expansion Units	50FCQM07; 50FCQM07;
NRCA-MCH-18-A Energy Management Control Systems	50FCQM07;
NRCA-MCH-19-A Occupancy Sensor Controls	50FCQM07;

P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no NRCV forms required for this project.

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	No
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	Yes
11	No	The scope of the project includes only duct systems serving healthcare facilities		
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft² of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Duct Insulation R-value		
22				
23				

M. COOLING TOWERS

This section does not apply to this project.

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Matthew Torre	Documentation Author Signature:
Company: 15,000 Inc.	Signature Date:
Address: 6085 State Farm Dr. #130	CEA/ HERS Certification Identification (if applicable): M36958
City/State/Zip: Rohnert Park CA 94928	Phone: 707.577.0363

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: MATTHEW TORRE, PE	Responsible Design
Company: 15000 INC	Date Signed: 2023-10-23
Address: 6085 STATE FARM DR. #130	License: M36958
City/State/Zip: ROHENRT PARK CA 94928	Phone: 707.577.0363

L. DISTRIBUTION (DUCTWORK and PIPING)

			Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	No
			Duct leakage testing per CMC Section 603.10.1 required for these systems?	Yes
11	No	The scope of the project includes only duct systems serving healthcare facilities		
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft² of conditioned floor area.		
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:		
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.		
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A		
18		All ductwork is an extension of an existing duct system		
19		Ductwork serving individual dwelling unit		
20		< 25 ft of new or replacement space conditioning ducts installed		
21	R-8	Duct Insulation R-value		
22				
23				
The answers to the questions below apply to the following duct systems:		Front	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	No

Q. MANDATORY MEASURES DOCUMENTATION LOCATION

This table is used to indicate where mandatory measures are documented in the plan set or construction documentation.

01		02
Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block	Yes	Plan sheet or construction document location: M-Sheets

15000 INC.
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ROHNERT PARK, CA 94928 fax: 707.577.0364

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. TORRE
M 36958
Exp 9/30/24
MECHANICAL
STATE OF CALIFORNIA

SIGNED 5-20-2024

CLIENT

County of Sonoma
2300 County Center Drive, Suite A220
Santa Rosa, CA 95403

PROJECT TITLE

Sonoma Veteran's Memorial Hall HVAC Tenant Improvement

126 1st Street West
Sonoma, CA 95476

APPROVALS

Date Stamped: 7/9/2024 Permit #: BLD23-7808 Plans Examiner: Paul Marquez
REVIEWED FOR CODE COMPLIANCE - PERMIT SONOMA

#	REVISION	DATE
1	PLAN CHECK RESPONSE	05/21/2024

DRAWING TITLE

TITLE-24 DOCUMENTATION

ISSUE DATE	10/23/2023
ISSUE TYPE	OWNER REVIEW
DRAWN BY	RLY
CHECKED BY	MJT/JMT
SCALE	AS NOTED
PROJECT No.	1817.0.00

DRAWING

M7.02

APPLICABLE CODES & STANDARDS REFERENCES

PARTIAL LIST OF APPLICABLE CODES AS OF January 1, 2023*

2022 California Administrative Code (CAC), Part 1, Title 24 CCR*
2022 California Building Code (CBC), Part 2, Title 24 CCR
(2021 International Building Code, Vol. 1 & 2, and 2022 California amendments)
2022 California Electrical Code (CEC), Part 3, Title 24 CCR
(2020 National Electrical Code and 2021 California Amendments)
2022 California Mechanical Code (CMC), Part 4, Title 24 CCR
(2021 IAPMO Uniform Mechanical Code and 2022 California amendments)
2022 California Plumbing Code (CPC), Part 5, Title 24 CCR
(2021 IAPMO Uniform Plumbing Code and 2022 California amendments)
2022 California Energy Code (CEC), Part 6, Title 24 CCR
2022 California Fire Code (CFC), Part 9, Title 24 CCR
(2021 International Fire Code and 2022 California Amendments)
2022 California Existing Building Code (CEBC), Part 10, Title 24 CCR
(2021 International Existing Building Code and 2022 California Amendments)
2022 California Green Building Standards Code (CALGreen), Part 11, Title 24 CCR
2022 California Referenced Standards Code, Part 12, Title 24 CCR
Title 19 CCR, Public Safety, State Fire Marshal Regulations
2016 ASME A17.1/CSA B44-13 Safety Code for Elevators and Escalators *(per 2022 CBC Part 2 Ch 35)*
Note: Cal/OSHA Elevator Unit enforces CCR Title 8 and uses the 2004 ASME A17.1 by adoption

PARTIAL LIST OF APPLICABLE STANDARDS

NFPA 13 - Standard for the Installation of Sprinkler Systems (CA amended).....2022 Edition
NFPA 14 - Standard for the Installation of Standpipe and Hose Systems (CA amended)....2019 Edition
NFPA 17 - Standard for Dry Chemical Extinguishing Systems.....2017 Edition
NFPA 17A - Standard for Wet Chemical Extinguishing Systems.....2017 Edition
NFPA 20 - Standard for the Installation of Stationary Pumps for Fire Protection.....2016 Edition
NFPA 22 - Standard for Water Tanks for Private Fire Protection.....2013 Edition
NFPA 24 - Standard for the Installation of Private Fire Service Mains and
Their Appurtenances (CA amended).....2019 Edition
NFPA 72 - National Fire Alarm and Signaling Code (CA amended).....2022 Edition
NFPA 80 - Standard for Fire Doors and Other Opening Protectives.....2016 Edition
NFPA 2001 - Standard on Clean Agent Fire Extinguishing Systems (CA amended).....2018 Edition
UL 300 - Standard for Fire Testing of Fire Extinguishing Systems for
Protection of Commercial Cooking Equipment.....2005 (R2010)
UL 464 - Audible Signaling Devices for Fire Alarm and Signaling Systems,
Including Accessories.....2003 Edition
UL 521 - Standard for Heat Detectors for Fire Protective Signaling Systems.....1999 Edition
UL 1971 - Standard for Signaling Devices for the Hearing Impaired.....2002 (R2010)
ICC 300 - Standard for Bleachers, Folding and Telescopic Seating, and Grandstands.....2017 Edition

For a complete list of applicable NFPA standards refer to 2022 CBC (SFM) Chapter 35 and California Fire Code Chapter 80.

See California Building Code Chapter 35 for State of California amendments to the NFPA Standards.

*All parts of the 2022 California Building Code become effective January 1, 2023 except the effective date for the use of the 2022 Building Energy Efficiency Standards (Title 24, Part 1, Chapter 10) is January 8, 2023 and the effective date for the use of the California Administrative Code (Title 24, Part 1, Chapter 4) is March 5, 2022.

ELECTRICAL DEVICES

- JUNCTION BOX - WALL MOUNTED +18" A.F.F. U.O.N.
- JUNCTION BOX - FLOOR MOUNTED
- JUNCTION BOX - CEILING MOUNTED
- POWER OUTLET , DUPLEX - WALL MOUNTED +18" A.F.F. U.O.N.
- POWER OUTLET, DEDICATED DUPLEX - WALL MOUNTED +18" A.F.F. U.O.N.
- POWER OUTLET, SWITCHED DUPLEX - +18" A.F.F. U.O.N.
- POWER OUTLET, FOURPLEX - WALL MOUNTED +18" A.F.F. U.O.N.
- POWER OUTLET, DEDICATED FOURPLEX - WALL MOUNTED +18" A.F.F. U.O.N.
- POWER OUTLET, SIMPLEX - WALL MOUNTED +18" A.F.F. U.O.N.
- POWER OUTLET, DUPLEX - FLOOR MOUNTED, FLUSH LID U.O.N.
- POWER OUTLET, DEDICATED DUPLEX - FLOOR MOUNTED, FLUSH LID U.O.N.
- POWER OUTLET, FOURPLEX - FLOOR MOUNTED, FLUSH LID U.O.N.
- POWER OUTLET, DEDICATED FOURPLEX - FLOOR MOUNTED, FLUSH LID U.O.N.
- POWER OUTLET, DUPLEX - CEILING MOUNTED
- POWER OUTLET, DEDICATED DUPLEX - CEILING MOUNTED
- POWER OUTLET, FOURPLEX - CEILING MOUNTED
- POWER OUTLET, DEDICATED FOURPLEX - CEILING MOUNTED

CIRCUITING

- CIRCUIT - CONCEALED
- CIRCUIT - EXPOSED
- CIRCUIT - UNDER FLOOR, GROUND OR SLAB
- CIRCUIT - HOME RUN
- CIRCUIT - STUB OUT
- CIRCUIT - STUB DOWN
- CIRCUIT - STUB UP
- CIRCUIT - COMPLETE CONNECTION

EQUIPMENT

- DISCONNECT, NON-FUSED
- DISCONNECT, WITH FUSE
- STARTER, NON-FUSED
- STARTER, WITH FUSE
- DIVISION 15 FAN
- STARTER, WITH CIRCUIT BREAKER
- PANELBOARD FLUSH
- PANELBOARD SURFACE
- ENCLOSURE FLUSH
- ENCLOSURE SURFACE
- DISTRIBUTION BOARD
- METER SECTION
- MOTOR
- MTTB
- SITE PULL BOX / VAULT
- TRANSFORMER (T)

DIAGRAMS

- ATS — ATS
- PANEL 1LA — PANEL
- 100A 3P — CIRCUIT BREAKER
- XXXA XXP — FUSE
- XXXA XXP — UTILITY FUSE
- GROUND ROD
- (M) METER
- (M) METER CT
- TRANSFORMER

MISCELLANEOUS

- XX — DEMO KEYED NOTE TAG
- X — ELECTRICAL EQUIPMENT TAG
- 1 — KEYED NOTE TAG
- X / X — MECHANICAL EQUIPMENT TAG
- A — REVISION DELTA
- 1 — EQUIPMENT MANUFACTURER'S IDENTIFICATION NUMBER
- X / E- — DETAIL REFERENCE
- X / E1 | E2 — DETAIL REFERENCE
- PLAN NORTH — PLAN NORTH ARROW

ADA REQUIREMENTS

A. ALL HEIGHTS CALLED OUT ON PLANS ARE TO CENTERLINE OF DEVICE, U.O.N.

B. FOLLOW ALL ADA REQUIREMENTS FOR DEVICE MOUNTING:
- MAX UNOBSTRUCTED FORWARD REACH 48-INCHES TO TOP OF DEVICE.
- MIN UNOBSTRUCTED FORWARD REACH 15-INCHES TO BOTTOM OF DEVICE.
- MAX OBSTRUCTED FORWARD REACH 44-INCHES TO TOP OF DEVICE.
- MAX OBSTRUCTED SIDE REACH 46-INCHES TO TOP OF DEVICE.

ELECTRICAL SHEET INDEX

ABBREVIATIONS

A	AMPERES	IMC	INTERMEDIATE METAL CONDUIT
AC	ALTERNATING CURRENT	JB	JUNCTION BOX
AF	AMP FRAME	KV	KILO VOLT
AFD	ADJUSTABLE FREQUENCY DRIVE	KVA	KILO VOLT-AMP
A.F.F.	ABOVE FINISHED FLOOR	KW	KILO WATT
AFG	ABOVE FINISHED GRADE	KWH	KILO WATT-HOUR
AHJ	AUTHORITY HAVING JURISDICTION	LPS	LOW PRESSURE SODIUM
AHU	AIR HANDLING UNIT	LTG	LIGHTING
AIC	AMPS INTERRUPTING CAPACITY	LV	LOW VOLTAGE
AL	ALUMINUM	MAX	MAXIMUM
ANN	ANNUNCIATOR	MC	METAL-CLAD
APPROX	APPROXIMATE	MCC	MOTOR CONTROL CENTER
ARF	ABOVE RAISED FLOOR	MCP	MOTOR CIRCUIT PROTECTOR
ATS	AUTOMATIC TRANSFE SWITCH	MFR, MFGR	MANUFACTURER
AWG	AMERICAN WIRE GAUGE	MH	METAL HALIDE
BAT	BATTERY	MIN	MINIMUM
BFG	BELOW FINISH GRADE	MLO	MAIN LUGS ONLY
CATV	CABLE TELEVISION	MDP	MAIN DISTRIBUTION BOARD
℄	CENTERLINE	MSB	MAIN SWITCHBOARD
C, CND	CONDUIT	MTD	MOUNTED
CB	CIRCUIT BREAKER	MTS	MANUAL TRANSFER SWITCH
CCTV	CLOSED CIRCUIT TELEVISION	MV	MEDIUM VOLTAGE
CKT	CIRCUIT	(N)	NEW
CO	CONDUIT ONLY	N, NEUT	NEUTRAL
COMM	COMMUNICATIONS	N/A	NOT APPLICABLE
CONST	CONSTRUCTION	NC	NORMALLY CLOSED
CONT	CONTINUED	NIC	NOT IN CONTRACT
CP	CONTROL PANEL	NL	NIGHT LIGHT
CPT	CONTROL POWER TRANSFORMER	NO	NORMALLY OPEN
CT	CURRENT TRANSFORMER	NTS	NOT TO SCALE
CU	COPPER	OC	ON CENTER
DC	DIRECT CURRENT	PNL	PANEL
DWG	DRAWING	PT	POTENTIAL TRANSFORMER
(E)	EXISTING	PVC	POLYVINYL CHLORIDE
EA	EACH	PB	PULL BOX, ELECTRICAL
EF	EXHAUST FAN	R	RADIUS
EGU	ENGINE GENERATOR UNIT	RECEPT	RECEPTACLE, OUTLET
EM	EMERGENCY LIGHT W/BATTERY BACKUP	REQD	REQUIRED
EMT	ELECTRICAL METALLIC CONDUIT	RGS, RSG	RIGID GALVANIZED STEEL CONDUIT
ENT	ELECTRICAL NON-METALLIC CONDUIT	RTU	REMOTE TERMINAL UNIT
EP	EXPLOSION PROOF	SD	STORM DRAIN
EQ	EQUAL	SP	SPACE, SPARE
EQUIV	EQUIVALENT	SS	STAINLESS STEEL
EWC	ELECTRIC WATER COOLER	STD	STANDARDS, APPLICABLE
(F)	FUTURE	SW	SWITCH
FA	FIRE ALARM	SWBD	SWITCHBOARD
FACP	FIRE ALARM CONTROL PANEL	SWGR	SWITCHGEAR
FC	FAN COIL	T	THERMOSTAT
FDR	FEEDER	TP	TAMPER PROOF
FLUOR	FLUORESCENT	TV	TELEVISION
FU	FUSE	TVSS	TRANSIENT VOLT. SURGE SUPPRESSOR
G, GND	GROUND	TYP	TYPICAL
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	UF	UNDER FLOOR
GFI	GROUND FAULT INTERRUPTER	UG	UNDER GROUND
GFR	GROUND FAULT RELAY	U.O.N.	UNLESS OTHERWISE NOTED
HID	HIGH INTENSITY DISCHARGE	UPS	UNINTERRUPTABLE POWER SUPPLY
HO	CONTROL SWITCH, "HAND - OFF"	V	VOLT
HOA	CONTROL SWITCH, "HAND - OFF- AUTO"	VA	VOLT-AMP
HOR	CONTROL SWITCH, "HAND - OFF- REMOTE"	VFD	VARIABLE FREQUENCY DRIVE
HP	HORSE POWER	W	WITH
HPS	HIGH PRESSURE SODIUM	W/O	WITHOUT
HV	HIGH VOLTAGE	WH	WATER HEATER
HVAC	HEATING, VENTILATION & AIR-COND.	WHM	WATT-HOUR METER
IC	INTERRUPTING CAPACITY	WP	WEATHER PROOF
IG	ISOLATED GROUND	XFMR	TRANSFORMER

15000 INC.
heating, ventilation, air conditioning + plumbing design and engineering
6085 STATE FARM DR. #130 phone: 707.577.0363
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STAMP
REGISTERED PROFESSIONAL ENGINEER — COURTNEY A. CHURCH — Exp. 12-31-25 — ELECTRICAL — STATE OF CALIFORNIA

CLIENT
COUNTY OF SONOMA
23000 COUNTY CENTER DR., SUITE A220
SANTA ROSA, CA 95403

PROJECT TITLE
SONOMA VERTERAN'S MEMORIAL HALL HVAC TI

126 1ST STREET WEST
SONOMA, CA 95476

APPROVALS

#	REVISION	DATE
1	PERMIT BACKCHECK	05/21/2024

DRAWING TITLE
ELECTRICAL LEGEND AND ABBREVIATIONS

ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	-
SCALE	AS NOTED
15000 INC. PROJECT No.	
CONSULTANT PROJECT No.	

DRAWING
E001

ELECTRICAL SPECIFICATIONS 26 00 00

ELECTRICAL

1.01- RELATED DOCUMENTS
A. The General Conditions, Supplementary Conditions and Division 1 apply to the electrical work.

1.02 - WORK INCLUDES
A. Work included in this section: All materials, labor, equipment, services, and incidentals necessary to install the Electrical Work as shown on the drawings and as specified hereinafter, including, but not limited to the following:
1. Distribution system, including main switchboard, panelboards, and feeders.
2. Branch circuit wiring, wiring devices and connections to all equipment requiring electrical service.
3. Lighting fixtures with hangers, anchors and supports. Lighting Controls.
4. Electrical equipment grounding system.
5. Telecommunication boxes, outlets, raceways and cabletrays.
6. Mechanical equipment power and control connections as stated in the mechanical and electrical specifications and as shown on the mechanical and electrical drawings.
7. Fire alarm system shall be Design Build by a Fire Alarm contractor.
8. Security and access control.
9. Raceways, outlet boxes and power connections for security and access control system. Coordinate all requirements with Owner.
10. Sleeves, inserts and blocking in cast concrete as required for work in this section.
11. All required incidental work, such as excavating and backfilling, roof flashing, and testing.
12. Any other electrical work as might reasonably be implied as required, even though not specifically mentioned herein or shown on the drawings.

1.03 - INCORPORATED DOCUMENTS
A. Requirements of the general conditions, supplementary conditions, and division 1. sections apply to all work in this section, unless modified herein.
B. Published specifications, standard tests or recommended methods of trade, industry or government organizations apply to work of this section where cited by abbreviations noted below, unless modified herein.
1. NATIONAL ELECTRICAL CODE, LATEST EDITION, (NEC).
2. NEMA STANDARDS
3. UNDERWRITERS' LABORATORIES, INC. (UL).
4. LOCAL UTILITY COMPANY REGULATIONS.
5. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1.04 - CONDITIONS AT SITE:
A. Visit to site is required of all bidders prior to submission of bid. All will be held to have familiarized themselves with all discernible conditions and no extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not.

1.05 - QUALITY ASSURANCE
A. Conformance:
1. All work shall conform to the applicable requirements of Article 1.03 above.
2. The Contractor shall notify the Architect, prior to submission of bid, about any part of the design which fails to comply with abovementioned requirements.
3. If after contract is awarded, minor changes and additions are required by aforementioned authorities, even though such work is not shown on drawings or covered in specifications, they shall be included at Contractor's expense.
B. Coordination:
1. The Contractor shall become familiar with the conditions at the job site, and with the drawings and specifications and plan the installation of the electrical work to conform with the existing conditions and that shown and specified so as to provide the best possible assembly of the combined work of all trades.
2. The Contractor shall work out in advance all "tight" conditions, involving all trades and if found necessary, supplementary drawings shall be prepared by this Contractor, for the Architect's approval, before work proceeds in these areas. No additional costs will be considered for work which must be relocated due to conflicts with the work of other trades.

1.06 - SUBMITTALS
A. Product Data:
1. Comply with the General Provisions of the Contract.
2. Within 15 days after award of the Contract, submit:
a. Complete material list of all items proposed to be furnished and installed under this Section, including but not limited to the following items: Circuit breakers, lighting fixtures, conduit, devices, enclosures, etc.
b. Manufacturers' specifications and other data required to demonstrate compliance with the specified requirements.
c. Manufacturers' recommended installation procedures which, when approved by the Architect, shall become the basis for inspecting and accepting or rejecting actual installation procedures used on the work.
3. Shop Drawings: Furnish shop drawings and/or equipment cuts for the following:
a. Light Fixtures
b. Switchboard
c. Panelboards
d. Motor Starters, Control Equipment, and Control Relays
e. Disconnect Switches
f. Fire Alarm System
g. Lamps
h. Ballasts
i. Lighting Control System
j. Security and access Control
k. Switches, receptacles and faceplates.
4. Test Reports:
a. Factory Tests where indicated for specific equipment.
b. Field Tests: Performance tests as specified for specific equipment.
c. When series rated circuit breakers are used, provide a letter from the manufacturer of the equipment confirming that U.L. series rating exists for all protective devices. State the available fault current from the Utility Company and indicate that the overcurrent devices exceed the available fault current at the respective point of protection.

1.07- MATERIALS
A. Materials of the same type or classification, used for the same purpose, shall be the product of the same manufacturer.

1.08 - ACCEPTABLE MANUFACTURERS
A. Materials shall be of make mentioned elsewhere in this specification. All materials shall be the best of their several kinds, perfectly new and approved by the Underwriters' Laboratories.
B. Where material, equipment, apparatus or other products are specified by manufacturer, brand name, type or catalog number, such designation is to establish standards of desired quality, style and utility and shall be the basis of the bid. Materials so specified shall be furnished under the contract unless changed by written approval of the Owner's Representative. Where two or more designations are listed, choice shall be optional with this Contractor, but this Contractor must submit his choice for final approval.

1.09 - DELIVERY, STORAGE AND HANDLING
A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all trades.
B. Delivery and Storage: Deliver all materials to the job site in their original containers with all labels intact and legible at time of use. Store in strict accordance with approved manufacturers' recommendations.
C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.
D. This Contractor shall personally, or through an authorized representative, check all materials upon receipt at jobsite for conformance with approved shop drawings and/or plans and specifications.

1.10 - SCHEDULING/SEQUENCING
A. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet the construction schedule, together with any special handling charges, shall be borne by this Contractor.

1.11 - REQUIREMENTS
A. The contract drawings indicate the extent and general arrangements of the conduit wiring systems, etc. If any departures from the contract drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted as soon as practicable, and within 10 days after award of the electrical contract.
B. UNLESS MATERIAL LIST AND DATA IS RECEIVED AS A COMPLETE AND ALL INCLUSIVE SUBMITTAL WITHIN THE STIPULATED TIME ALL ITEMS SHALL BE PROVIDED AS SPECIFIED-WITH NO DEVIATIONS PERMITTED.
C. Any and all additional costs incurred by the substitution of electrical material or equipment, or installation thereof, whether architectural, structural, plumbing, mechanical or electrical, shall be borne by the Contractor under this section.

1.12 - IDENTIFICATION
A. Switchboards, feeder circuit breakers in switchboards, panels, disconnect switches, motor starters and motor disconnect switches, cabinets, and other apparatus used for the operation of, or control of circuits, appliances or equipment, shall be properly identified by means of engraved laminated plastic descriptive nameplates mounted on apparatus using stainless steel screws. Nameplates shall have white letters with black background and be submitted to the Architect for approval. Cardholders in any form are not acceptable.
B. Each branch circuit of panelboards to have a permanently fixed number with directory, mounted under celluloid on inside of cabinet door, showing circuit numbers, room number feed and typewritten description of equipment supplied by breakers.
C. Each Panelboard, Switchboard and Motor Control Center shall be provided with an Arc-Flash warning label per NEC requirements.

PART 2 - PRODUCTS:

2.01 - GENERAL
A. Materials shall be new, packed in original containers, installed and turned over to the Owner free of defects.
B. Materials shall bear Underwriters' Laboratory label.
C. Furnish equipment and materials for any one system by same manufacturer.

2.02 - MATERIALS
A. Conduit
1. Conduit shall be delivered to the site of construction in the original bundles. Each length shall bear the label of the National Board of Fire Underwriters. All conduit subjected to rough usage while on the job, before installation, shall be removed from the premises upon notice.
2. Raceway and boxes located as indicated on drawings and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.
3. Rigid Steel: Hot dipped galvanized, used exposed and in concrete slab, with completely watertight fittings.
4. "Schedule 40" PVC shall be provided with code size minimum bare No. 12 ground wire with "Schedule 80" elbows and stub-ups.
5. All rigid steel conduit, couplings and elbows in soil or under membrane to be 1/2 tape wrapped with Scotch #50 tape and threaded ends coated with red lead prior to installation of couplings.
6. Use flexible conduit for all motor connections; Flexible metal type provide with code size (minimum No. 12) bare ground wire in all flexible conduit.
7. Conduit Bends - Long Radius.
8. Provide conduit seals at all concrete slab penetrations.
9. Contractor shall xray all existing concrete slab before core drilling.
10. All indoor conduit shall be installed concealed in walls or above ceiling unless noted otherwise
11. Installation:
a. Outdoor Locations:
- Above Grade: Provide rigid steel conduit. Provide cast metal outlet, pull, and junction boxes.
- In Soil: Provide Sched 40 or 80 PVC with Sched 80 PVC elbows (in marine/high moisture environments) or Rigid Steel elbows wrapped.
- In Concrete: Provide hot dipped galvanized rigid steel or Sched 40 PVC Conduit.
- Flexible Connection: WP Flexible metal conduit.
- Watertight and corrosion resistant fittings, couplings, boxes, etc.

b. Indoor Locations:
- Exposed Dry Locations: Provide galvanized rigid steel conduit or Intermediate metal conduit. Provide cast boxes. Electric Metallic Tubing may be provided in unfinished areas.
- Concealed Dry Locations: Provide electrical metallic tubing for sizes less than 2-inches. Provide galvanized rigid steel or intermediate steel conduit in sizes 2-inches or larger. Provide cast or sheet metal boxes.
  - Electric non-metallic tubing may be used from data/voice outlet to above non plenum ceiling only, otherwise it is unacceptable.
  - Flexible Conduit/MC cable may be used for the following applications only if allowed by the latest NEC publications:
    - Between light fixtures / light switches (not for homerun)
    - Between general 20A receptacles within walls (not for homerun)

    Cable must be the same size as the IMC or EMT conduit to which it is connected. Both the flexible metal conduit and it's fittings are to be listed for grounding. A green grounding conductor shall be installed. All connections are to be of a NEMA approved type.
- Electric non-metallic tubing may be used from data/voice outlet to above non plenum ceiling only, otherwise it is unacceptable.
- Locations subject to Corrosive Atmosphere: Provide PVC coated, galvanized rigid steel or intermediate steel conduit. Provide PVC coated cast or sheet metal boxes.
- Hazardous Locations (Per NEC Article 500): Galvanized rigid steel conduit. Cast iron boxes with threaded hubs for conduit entry. Conduit seals.

B. Conduit Fittings:
1. Fittings for rigid steel and flexible type conduit shall be of a type as required, malleable iron or steel, galvanized or sherardized.
C. Outlet Boxes and Junction Boxes:
1. Galvanized one piece steel knockout type, unless otherwise noted, sizes as required for conditions at each outlet or as noted, not smaller than 2 inches wide by 4 inches high, ganged where multiple switch locations are indicated.
2. Outlet boxes located on exterior to be flush type (unless notes otherwise) with Weatherproof extra duty In-Use cover with lockable covers for receptacles.
3. All connectors from conduit to junction or outlet boxes shall have integral insulated throats.
4. Flush Service Floor Boxes: Multi-gang, cast iron, watertight, with corrosion resistant finish, exterior levelling screws, removable partitions, adjustable before and after concrete pour, with gasketed cover, meeting U.L 514. Coordinate with Owner's Representative and provide brass or black carpet plate (per owners preference) where required.
5. Outlet boxes for telephone and cable TV outlets shall be 4" square minimum with single gang plaster rings.
D. Power Wire and Cable:
1. Copper 90% conductivity. Solid copper for conductors smaller than No. 8 AWG. Stranded copper for conductors No. 8 AWG and larger. No conductors smaller than No. 12 AWG, except as noted.
2. Insulation type: #12 to #1 AWG: THWN for wet locations and THHN for dry locations. #1/0 through #4/0 AWG: XHHW (55 Mils). 250MCM and larger: XHHW (65 Mils).
3. Conductors No. 8 and larger and as otherwise noted on drawings shall be stranded.
4. Connections to devices from "through_feed" branch circuit conductors to be made with pigtails, with no interruption of the branch circuit conductors.
5. Neutral conductor identified by white outer covering braid, with different tracers of "EZ" numbering tags used where more than one neutral conductor is contained in a single unit.
6. Neatly arrange and "marlin" wired in panels and other equipment with "T and B Ty-rap" or approved equal plastic type strapping.
7. Label each wire of each electrical system in each pull box, junction box, outlet box, terminal cabinet, and panelboard in which it appears with "EZ" numbering tags.
8. All wire and cable shall bear the Underwriters' Label, brought to the job in unbroken packages; wire color coded as follows:

Voltage	Phasing	A Phase	B Phase	C Phase	Neutral
120\240	1p3w	Black	Red	-	White
120\208	3p 4w	Black	Red	Blue	White
208	3w	Black	Red	Blue	-
277\480	3p 4w	Brown	Orange	Yellow	White
480	3w	Brown	Orange	Yellow	-

E. Telecommunication Wiring/ Receptacles:
1. Category 6 UTP cable: Unshielded, 4 twisted-pair, 24 AWG copper, Category 6
2. Indoor Fiber Optic backbone cable: 12 strand, 62.5/125 m, multi-mode, riser type, NEC rated OFNR/FT4, color coded, ripcord, 900 m buffer coating
2. Telephone single port: Leviton 40644-00W or equal.
3. For Indoor TV outlets: single gang with cable TV jack.
4. Route in cable tray or on J-hooks (max 8ft on center where above accessible ceiling) or conduit (where non accessible).
F. Receptacles: Leviton Decora style or equal, 125 volts, specification grade, conventional style, white color, unless otherwise noted:
1. 15A 3PG 125 volt duplex TP - Leviton T5325-W or equal
2. 15A 3PG 125 volt duplex TP with USB - Leviton T5632-W
3. 20A 3PG 125 volt duplex TP - Leviton T5825-W or equal
2. 20A 3PG 125 volt duplex TP with USB - Leviton T5832-W
3. 15A 3PG 125 volt duplex AFCI TP - Leviton AFTR1-W or equal
4. 20A 3PG 125 volt duplex AFCI TP - Leviton AFTR2-W or equal
3. 20A 3PG 125 volt duplex GFCI/AFCI TP - Leviton AGTR2-W or equal
4. 20A 3PG 125 volt duplex GFCI TP - Leviton GFWT2-W or equal
5. 15A 3PG 125 volt duplex TP Pop-up floor box - Leviton PFTR1 (verify color)
5. 15A 3PG 125 volt duplex TP with USB Pop-up floor box - Leviton PFUS1 (verify color)
6. 20A 3PG 125 volt duplex TP Pop-up floor box - Leviton PFTR2 (verify color)
6. 20A 3PG 125 volt duplex TP with USB Pop-up floor box - Leviton PFUS2 (verify color)
7. 20A 3PG 125 volt isolated ground receptacle, 3 wire, orange color 1 I.G.
8. Special appliances receptacles: Match NEMA configuration of equipment plug.
H. Plates: Leviton white, or equal, except as noted:
1. For Indoor flush outlet boxes: Decora Style.
1.1. Single gang: Leviton 80301-SW (snap) or equal
1.2. Double gang: Leviton 80309-SW (snap) or equal
2. Plates for surface mounted outlets: galvanized steel unless otherwise noted.
3. Exterior Locations - Weatherproof extra duty In-Use cover - Leviton 5980-UCL or equal.
I. Motor Disconnect Switches and Safety Switches: Heavy Duty Type, cover interlocked with operating handle so that cover cannot be opened with switch in closed position and switch cannot be closed with cover in open position, 240 or 480 volt rating, as required or as noted on drawings, in Nema 1 enclosure indoors, 3R enclosure outdoors, or as otherwise noted. All motor circuit fuses shall be dual element type.
J. Lugs and Connectors: Thomas and Betts "lock-tite", for No. 4 and larger wire; "Scotchlock" with insulator for No. 6 and smaller wire.
K. Splice Insulation: "Scotch" electrical tape with vinyl plastic backing or rubber tape with protective friction tape for interior work.
L. Grounding:
1. Install ground wires in rigid conduit. Provide physical protection for grounding electrode and bonding conductors in accordance with nec 250-64. Grounding conductors shall be in conduit and installed in accordance with NEC 250-64(e).
2. All grounding electrode conductor connections "thermite" or "cad_weld" welded.
3. Use approved pressure type solderless connector or use fusion welding for all connections to and bonding of grounding electrode system. All connections shall be visible, readily accessible for testing purposes.
4. Terminate grounding conduits at equipment with ground bushing, with ground wire connected through bushing.
5. Provide No. 12 stranded (green) THHN conductor from outlet box to ground screw of <u>every</u> receptacle except isolated ground receptacles.
6. Ground all isolated sections of metallic raceways.
7. Provide #12 minimum stranded (green) THHN conductor sized per NEC, or as noted, connected continuously throughout branch circuit for all circuits, bonded to panel ground bus, and to all electrical devices and equipment enclosures.
8. After installation, test system, using the three-point fall of potential method <u>only</u>. Record results and submit to Architect for approval. If resistance to ground exceeds three (3) ohms, install additional ground rods, bonded and interconnected to grounding electrode system. Provide additional grounding until resistance is less than three (3) ohms.
M. Panelboards:
1. Surface or flush mounted, with branch circuits as shown on drawings.
2. Enclosures: code gauge galvanized sheet steel with welded full flange end pieces, stretcher_ leveled steel trim, backpan and door.
3. Bussing of copper with silver_plated contact surfaces.
4. Trims on surface_mounted cabinets secured with nickel_plated screws with cup washers, <u>bottom of all trims</u> to have lugs for resting on cabinet flange.
5. Panels shall be 20 inches minimum in width, provided with approved gutter space, barriers and adjustable supports. Doors mounted with concealed hinges provided with combination spring latch and lock. Doors and trims and surface mounted cabinets primed and finished with one coat baked on gray enamel.
6. Breakers on same phase to be aligned horizontally. Each panel provided with 5_handle locks.
7. Each branch circuit of panelboards to have a permanently fixed number with one word directory, mounted under celluloid on inside of cabinet door, showing circuit numbers and typewritten description of outlets controlled by breakers. Color code mains and each breaker terminal, same as conductor insulation.
8. Each panel shall be equipped with a copper ground bus.
N. Circuit Breakers:
1. General: Circuit breakers shall be molded case rated for 480 or 240 volts, multiple or single pole and amperage rating as shown on the drawings, bolt on, manually operated with "de-ion" arc chutes.
2. Distribution circuit breakers shall be rated for the amps interrupting capacity noted on the drawings or U.L. series rated with the main circuit breaker.
3. Branch circuit breakers shall be rated for the amps interrupting capacity or U.L. series rated with the distribution and main circuit breakers, General Electric type TEB or equal, minimum 22,000 A.I.C for 120/208 volt, type TED or equal, minimum 42,000 A.I.C for 277/480 volt.
4. Where mechanical equipment is U.L. listed for overcurrent protection with fuses or HACR type circuit breakers, provide fuses where a fused switch is shown. Where the overcurrent protection is a circuit breaker provide HACR, (HACR means Heating, Air-Conditioning and Refrigeration) type.
5. Provide type "SWD" circuit breakers were the circuit breaker is going to be used as a switching device in a panelboard.
6. Provide GFCI rated circuit breakers in all locations within 6-feet of water.
O. Starters:
1. Magnetic starters shall be rated in accordance with latest published NEMA standards for size and horsepower rating, Westinghouse A-200 series or equal. Provide with overload sensor in each phase, hand-off-auto switch, red "run" pilot light, in Indoor NEMA 1,Outdoor NEMA 4X, or NEMA 3R enclosure as shown. Coil shall be rated 120 VAC. Starters shall be across-the-line non-reversing unless otherwise noted.
2. Contacts: Across-the-line magnetic starters shall be equipped with double break silver alloy contacts. All contacts shall be replaceable without removing power wiring or removing starter from panel. The starter must have straight-through wiring.
3. Coils: Coils shall be of molded construction. All coils shall be replaceable from the front without removing the starter from the panel.
4. Overload Relays and Thermal Units: Overload relays shall be the melting
P. Motor Connections:
1. Install motor circuits complete for all motors by other trades as shown on drawings.
2. Furnish and install all disconnect switches, outlet boxes, starters, timeswitches etc., where noted.
3. All motor and temperature control low voltage wiring shall be installed and connected by Division 15 Section of specifications, unless otherwise indicated on electrical and mechanical drawings.
Q. Motor / Equipment Switches: Rated 20 amp, 277 volt, quiet type, white color, specification grade; unless otherwise noted.
1. Single Pole _ toggle or rocker switch
2. Wall mounted Occupancy Sensors- Dual Technology
R. Lighting Controls: Provide full room controls to provide the control requirements shown. Manufacturer shall have min 10yrs in manufacturing of similar products. All accessory items such as switches, light fixtures etc shall be specifically designed and approved by the manufacturer to function together. Manufacturer's include Wattstopper, Leviton, Lutron or equal. Provide detailed wiring diagrams, device layout locations, and devices controlled for approval.

As listed in fixture schedule, and on drawings as indicated by type letter, completely lamped with new lamps, properly operating at time of acceptance of electrical work. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

a) Standards:
- ENERGY STAR certified.
- California Title 24 compliant.
- UL Listing: Listed for damp location.
- Recessed luminaires shall comply with NEMA LE 4.

1. Lamps:
a. Unless otherwise noted, lamps described on the Drawings and in these Specifications, are ANSI nomenclature; lamps shall be manufactured by Osram/Sylvania, North American Philips, or approved equal.
b. All incandescent lamps and tungsten halogen lamps shall be 125 -130 volt rated extended life or 2,000 hour life whenever such designs are available.
c. T8 fluorescent lamps shall be 3500K-4100K color temperature, energy saving type suitable.
d. Compact fluorescent lamps shall be 3500K-4100K color temperature, twin-tube and double twin tube (as required for each fixture), as manufactured by North American Philips, approved equal.
e. LED lamps shall be 3500K-4100K color temperature. All LED shall be 0-10V dimming unless specifically stated otherwise. If contractor finds a fixture is not available with 0-10V dimming and the contractor shall alert the GC prior to Bid.
f. CRI of minimum 80. CCT
g. Rated lamp life of 35,000 hours to L70.
h. Lamps dimmable from 100 percent to 1 percent of maximum light outpu
3. Ballasts:
a. Fluorescent Lamp Ballasts: Solid State full light output Class P, ETL certified to CBM standards, high power factor one, two, three, or four lamp types; minimum starting temperature 50 degrees F. unless otherwise noted. Ballasts containing "PCB" are not permitted. The allowable total harmonic distortion shall be equal to or less than 10%. Maximum crest factor 1.4. Power factor .97 or greater. Advance, Magnetek, Lutron or Motorola.
b. Sound Ratings: "A", or the lowest rating available, for the number and types of lamps ballasted. Replace noisy ballasts at no cost to the Owner.
c. All ballasts shall be high power factor energy efficient type.
d. Ballasts in refrigerated spaces or outdoors shall be zero (0) degree F. temperature rated.
e. All ballasts shall be operated without excessive or unusual noise. Noisy or otherwise defective ballasts shall be replaced.
f. Contractor shall burn in lamps per manufacturer's instructions.
4. Plastic:
a. Translucent Plastic Components: Translucent plastic shall be made of smooth, white, 100 percent virgin acrylic material.
b. Plastic Lenses: Lenses shall be uncolored 100 percent virgin acrylic plastic.
5. Finish on Metal Parts:
a. Steel Reflectors: Unless otherwise specified, the reflector surface finish shall be of synthetic white enamel or polyester powder coating.
b. Aluminum Reflectors: Reflecting surfaces shall be provided with either a specular or diffuse finish as indicated.
c. Non_Reflecting Surfaces: Unless otherwise specified, the finish on all non_reflecting exterior surfaces shall be aluminum oxide or aluminum; white, gray or aluminum paint on steel; nickel or chromium plating on copper alloy. Fastening devices shall be nickel, chromium, cadmium or zinc plated.

PART 3 - EXECUTION

3.01 - INSPECTION

A. Examine the areas and conditions under which the work of this Section will be installed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 - PREPARATION
A. Drawings
1. The general arrangement and location of wiring and equipment is shown on the electrical drawings and shall be installed in accordance therewith, except for minor changes required by conflict with the work of other trades.
2. Drawings indicate the circuit and panel which supplies each device or fixture. Provide and install conduit and conductors to make all connections from panel to nearest device and from first device to additional devices on same circuit. Conduit size and fill shall satisfy NEC requirements. Two or three different phases supplied by a 3_phase panel may share a single neutral only if circuit positions are adjacent in the panel and the breakers will have to be provided with a handle tie or multi-pole breaker per NEC requirements. Do not exceed 4 #12 or 3 #10 conductors in a 1/2" conduit, 7 #12 or 5 #10 in a 3/4" conduit, or 11 #12 or 9 #10 in a 1" conduit, unless otherwise noted. If more than three current carrying conductors are installed in one conduit, conductor size shall be increased as required per Note 8 to Table 310_16 of the NEC.
3. Drawings indicate the location of all light switches. Where fixtures in a room are controlled by more than one switch, the same lower case letter is drawn adjacent a switch and each fixture controlled by that switch. Where no lower case letter is adjacent to a switch, all fixtures in the room are controlled by that switch. Provide and install conduit and wire from fixture to switch and between fixtures as required to accomplish switching shown. Do not route branch circuit wiring for light fixtures through switch boxes.
4. Control wiring is generally not shown on the plans. Contractor shall refer to control diagrams and provide and install all wiring and raceways required to make all interconnections.
5. All branch circuit wiring No. 12 or larger as noted, all control wiring No. 14 or larger.
6. All dimensions, together with locations of doors, partitions, etc. are to be taken from the Architectural Drawings, verified at site by this Contractor.
7. Maintain "as-constructed" Record Drawings at all times, showing the exact location of concealed conduits and feeders installed under this contract, and actual numbering of each circuit. Upon completion of work and before acceptance can be considered, this Contractor must forward to the Owner's Representative corrected Record Drawings in Autocad format indicating the electrical work as installed.

3.03 - FIELD QUALITY CONTROL
A. All workmanship shall be first class and carried out in a manner satisfactory to and approved by the Architect.
B. This Contractor shall personally, or through an authorized and competent representative, constantly supervise the work and so far as possible keep the same foreman and workmen on the job throughout.

3.04 - INSTALLATION/APPLICATION/ERECTION
A. Cutting, repairing and structural reinforcing for the installation of this work shall be done by the General Contractor in conformance with the Architect's requirements.
B. Provide and place in form work all conduit, inserts and sleeves in time to prevent any delay in the concrete work.

3.05 - ADJUSTING AND CLEANING
A. Main switchboard, panelboards and all other electrical equipment not "finish painted" under other sections shall be touched up where finished surface is marred or damaged. Panelboards in finished areas shall be painted to match wall.
B. All equipment, lighting fixtures, etc., shall be left in clean condition, with all shipping and otherwise unnecessary labels removed therefrom.
C. Excavate and trench as necessary for the electrical installation, and when the work has been installed, inspected and approved, backfill all excavations with imported sandy soil in maximum 8" (eight inch) layers, moisten and machine tamp to 95% compaction, and restore the ground and/or paving or floor surfaces to their original condition. Comply with requirements of Division 2.

3.06 - SCHEDULES
A. Coordination: Coordinate installation of electrical items with the schedule for other work to prevent unnecessary delays in the total Work.

3.07 - TESTING
A. Grounding System:
1. All ground connections shall be checked and the entire system shall be checked for continuity. The resistance of the ground system shall be measured using a 3 point fall_of_potential method. The maximum ground resistance shall be three ohms. If the measured ground resistance exceeds three ohms, additional ground rods shall be installed until a value of three ohms or less is obtained.
2. Ground tests shall meet the requirements of the National Electric Code.
B. Lighting Systems:
1. The interior and exterior lighting systems shall be checked for proper local controls and operation of entire installation, including the operation of the low voltage lighting control system.
C. Power Distribution System:
1. Tests: Test main switchboard, distribution boards,and panelboards for grounds and shorts with mains disconnected from feeders, branch circuits connected and circuit breakers closed, all fixtures in place and permanently connected and grounding jumper to neutral lifted and with all wall switches closed.
2. Test each individual circuit at each panelboard with equipment connected for proper operation. Inspect the interior of each panel.
3. Check verification of color coding, tagging, numbering, and splice make up.
4. Verify that all conductors associated with each circuit are in same conduit.
5. Demonstrate that all lights, jacks, switches, outlets,and equipment operate satisfactorily and as called for.
D. Fire Alarm System: Verify that all equipment, components, and devices function as specified and to the satisfaction of the Authority Having Jurisdiction.

WIRING NOTES

1. IF MORE THEN 3 CURRENT CARRYING CONDUCTORS ARE INSTALLED PER RACEWAY. CONTRACTOR SHALL DEMONSTRATE COMPLIANCE WITH NEC TABLE 310.15(B) (3) (a).
1.1. MAX (9) #12 AWG FOR 20A CIRCUITS.
1.2. MAX (6) #10 AWG FOR 30A CIRCUITS.
1.3. MAX (6) #8 AWG FOR 40A CIRCUITS.

2. FOR BRANCH CIRCUITS DO NOT EXCEED NEC CONDUIT FILL REQUIREMENTS, PROVIDE MAX:
2.1. MAX (9) #12 AWG THHN PER 3/4"EMT CONDUIT.
2.2. MAX (6) #10 AWG THHN PER 3/4" EMT CONDUIT.
2.3. MAX (4) #8 AWG THHN PER 3/4" EMT CONDUIT.
2.4. MAX (3) #6 AWG THHN PER 3/4"EMT CONDUIT.
2.5. MAX (2) #4 AWG THHN PER 3/4"EMT CONDUIT.
2.6. MAX (3) #4 AWG THHN PER 1" EMT CONDUIT.
2.6. MAX (2) #2 AWG THHN PER 1" EMT CONDUIT.
2.7. MAX (3) #2 AWG THHN PER 1 1/4" EMT CONDUIT.

3. FOR 20A CIRCUITS PROVIDE MINIMUM:
3.1. UP TO 75FT - #12 AWG
3.2. 75FT TO 150FT - #10 AWG
3.3. 150FT TO 250FT - #8 AWG

4. ADHERE TO VOLTAGE DROP LIMITS AS SHOWN BELOW:

SUMMARY OF VOLTAGE DROP LIMITS

CIRCUIT VOLTS (V)	2% VOLTAGE DROP (V)	3% VOLTAGE DROP (V)	TOTAL LOSS (V)
120	2.4	3.6	6.0
208	4.2	6.2	10.4
240	4.8	7.2	12.0
277	5.5	8.3	13.9
480	9.6	14.4	24.0

VOLTAGE DROP FOR COMMON COPPER WIRE GAUGES AND CURRENT LOADS

WIRE	CIRCUIT AMPS	MAXIMUM FEEDER LENGTH					MAXIMUM BRANCH CIRCUIT LENGTH				
		120	208	240	277	480	120	208	240	277	480
14	12	39	67	78	90	156	58	101	117	135	233
12	16	46	80	93	107	185	69	120	139	160	278
10	24	48	83	96	111	192	72	125	144	166	288
8	32	57	99	115	132	229	86	149	172	199	344
6	40	73	127	146	169	293	110	190	220	253	439
4	52	89	154	178	206	356	134	232	267	309	535
2	72	103	178	206	237	412	154	267	309	356	617
0	96	123	212	245	283	490	184	319	368	424	735
00	108	137	238	274	317	549	206	357	412	475	823
0000	144	163	283	327	377	654	245	425	490	566	980
250 (kcmil)	164	170	294	340	392	679	255	441	509	588	1019
300	184	181	314	362	418	725	272	471	543	627	1087
350	200	195	338	390	450	779	292	506	584	675	1169
500	248	224	388	448	517	896	336	582	672	776	1344

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ELECTRICAL
STATE OF CALIFORNIA

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23000 COUNTY CENTER DR., SUITE A220
SANTA ROSA, CA 95403

PROJECT TITLE
SONOMA VERTERAN'S MEMORIAL HALL HVAC TI

126 1ST STREET WEST
SONOMA, CA 95476

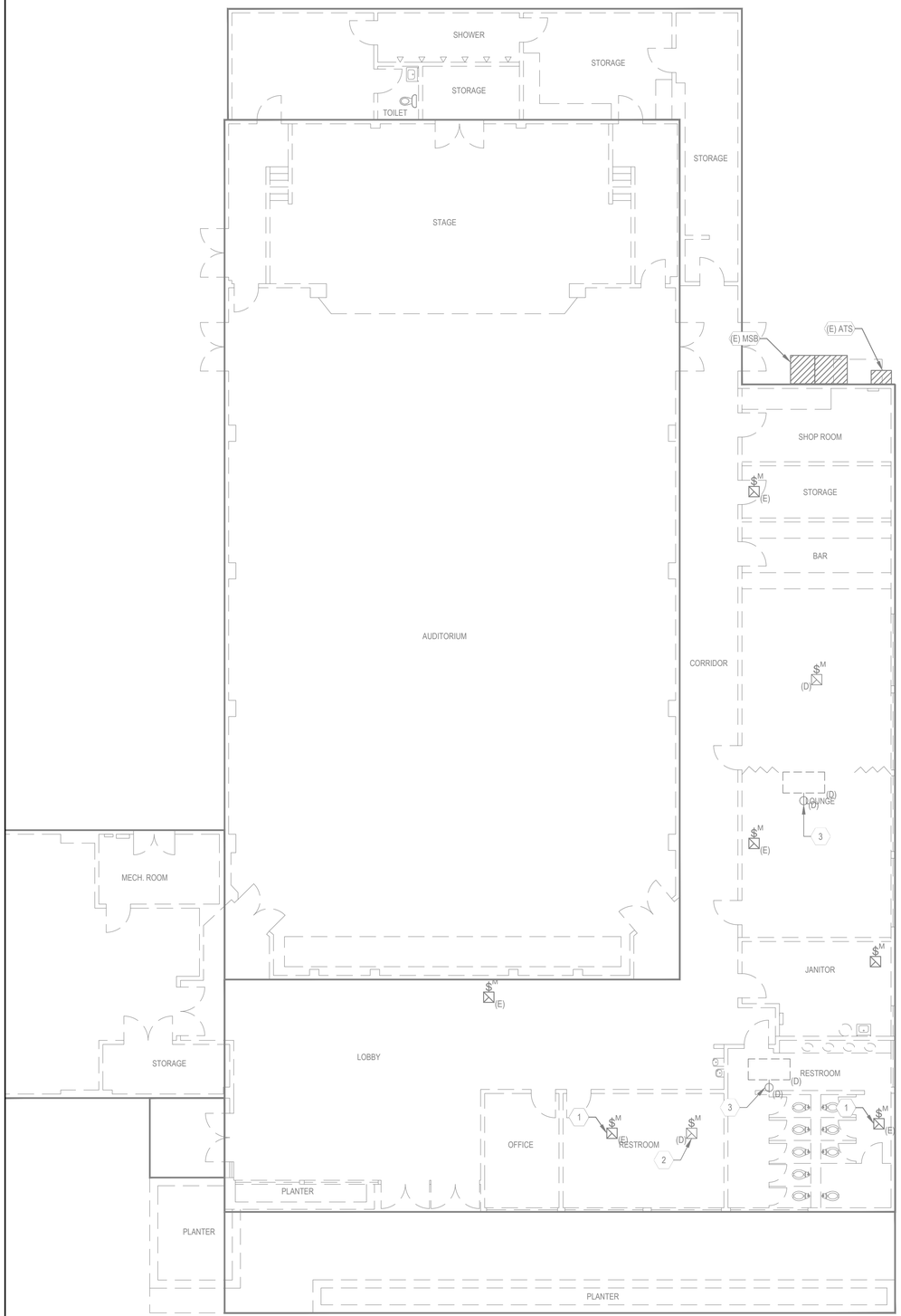
APPROVALS

#	REVISION	DATE
1	PERMIT BACKCHECK	05/21/2024

DRAWING TITLE
ELECTRICAL SHEET SPECIFICATION

ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	-
SCALE	AS NOTED
15000 INC. PROJECT No.	
CONSULTANT PROJECT No.	

DRAWING
E002



1 DEMOLITION ELECTRICAL PLAN

SCALE: 1/8" = 1'-0"

0 8' 16' 32'

SHEET NOTES - DEMOLITION

A. DEMOLITION DRAWINGS ARE BASED ON CASUAL FIELD OBSERVATION AND EXISTING AVAILABLE RECORD DOCUMENTS.

B. REMOVE CONDUIT, WIRE, BOXES, AND FASTENING DEVICES TO AVOID ANY INTERFERENCE WITH NEW INSTALLATION.

C. DISCONNECT, REMOVE AND/ OR EXTEND ELECTRICAL SYSTEMS IN WALLS, FLOORS, AND CEILINGS SCHEDULED FOR REMOVAL.

D. RECONNECT EQUIPMENT BEING DISTURBED BY RENOVATION WORK AND REQUIRED FOR CONTINUE SERVICE TO NEAREST AVAILABLE PANEL.

E. DISCONNECT OR SHUT OFF SERVICE TO AREAS WHERE ELECTRICAL WORK IS TO BE REMOVED. REMOVE ELECTRICAL FIXTURES, EQUIPMENT, AND RELATED SWITCHES, OUTLETS, CONDUIT AND WIRING WHICH ARE NOT PART OF FINAL PROJECT.

F. INSTALL TEMPORARY WIRING AND CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION.

G. DO NOT PERFORM WORK ON ENERGIZED EQUIPMENT OR CIRCUITS.

H. REMOVE, RELOCATE, AND EXTEND EXISTING INSTALLATIONS TO ACCOMMODATE NEW CONSTRUCTION.

I. REPAIR ADJACENT CONSTRUCTION AND FINISHES DAMAGED DURING DEMOLITION AND EXTENSION WORK.

J. REMOVE EXPOSED ABANDONED GROUNDING AND BONDING COMPONENTS, FASTENERS AND SUPPORTS, AND ELECTRICAL IDENTIFICATION COMPONENTS, INCLUDING ABANDONED COMPONENTS ABOVE ACCESSIBLE CEILING FINISHES. CUT EMBEDDED SUPPORT ELEMENTS FLUSH WITH WALLS AND FLOORS.

K. CLEAN AND REPAIR EXISTING EQUIPMENT TO REMAIN OR TO BE REINSTALLED.

L. PROTECT AND RETAIN POWER TO EXISTING ACTIVE EQUIPMENT REMAINING.

M. CAP ABANDONED EMPTY CONDUIT AT BOTH ENDS.

N. SEAL ANY PENETRATIONS IN FIRE RATED WALLS.

O. PATCH, REPAIR AND RE-FINISH (E) SURFACES DAMAGED DUE TO DEMOLITION.

KEYED NOTES - DEMOLITION

1. DISCONNECT AND REMOVE EXISTING EXHAUST FAN. RE-USE LOCATION FOR NEW EXHAUST FAN INSTALLATION. RECONNECT TO EXISTING CIRCUIT.

2. DISCONNECT AND REMOVE ALL EQUIPMENT AND FEEDERS ASSOCIATED WITH DEMOLISHED EQUIPMENT. SEE MECHANICAL PLANS FOR EXACT EQUIPMENT.

3. DISCONNECT EXISTING CONNECTION 120V, SINGLE PHASE CIRCUIT. RE-USE AND EXTEND TO NEW CONVIENCE RECETPTCLE LOCATION.

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126 1ST STREET WEST
SONOMA, CA 95476

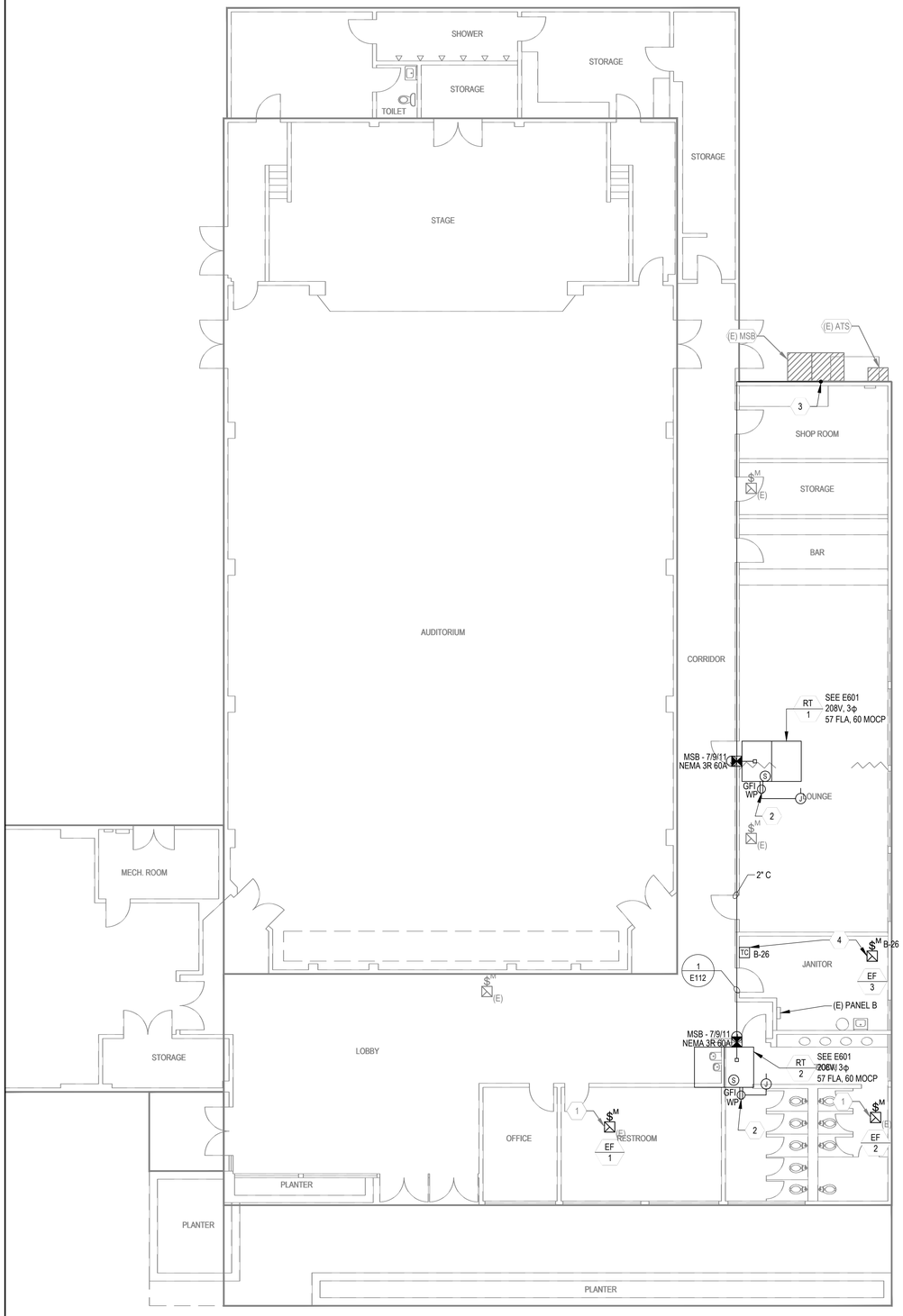
APPROVALS

#	REVISION	DATE
1	PERMIT BACKCHECK	05/21/2024

DRAWING TITLE
DEMOLITION PLAN

ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	
SCALE	AS NOTED
15000 INC. PROJECT No.	
CONSULTANT PROJECT No.	

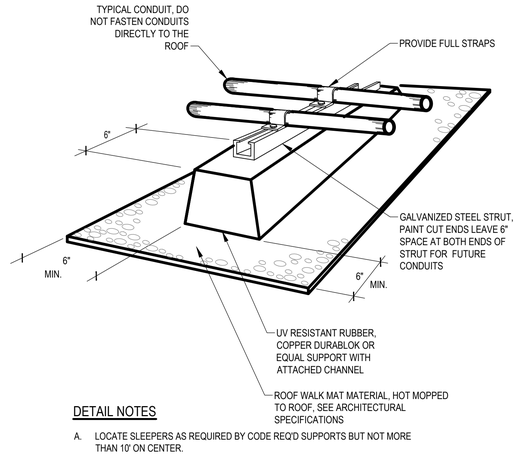
DRAWING
E101



1 ELECTRICAL ROOF PLAN

SCALE: 1/8" = 1'-0"

0 8' 16' 32'



DETAIL NOTES

A. LOCATE SLEEPERS AS REQUIRED BY CODE REQ'D SUPPORTS BUT NOT MORE THAN 10' ON CENTER.

1 ROOF MOUNTED ELECTRICAL SLEEPER

NOT TO SCALE

SHEET NOTES - ROOF ELECTRICAL

A. ALL ROOF CONDUITS SHALL BE MOUNTED ON COOPER DURA-BLOK OR EQUAL AT MAX 10FT ON CENTER.

B. ALL ROOF MOUNTED CONDUITS SHALL BE IMC OR RGS WITH WATERTIGHT FITTINGS.

C. ALL ELECTRICAL ROOF PENETRATIONS SHALL BE PROVIDED COMPLETE, COORDINATED WITH ALL OTHER DISCIPLINES AND WATER TIGHT. REFER TO THE ARCHITECTURAL DRAWING AND SPECIFICATIONS FOR REQUIREMENTS.

D. VERIFY EXACT LOCATIONS OF DIVISION 23 EQUIPMENT WITH THE DIVISION 23 CONTRACTOR PRIOR TO ROUGH-IN.

E. LOCATIONS OF DIVISION 23 EQUIPMENT IS DIAGRAMMATIC. THE DIVISION 26 CONTRACTOR SHALL VERIFY AND COORDINATE EXACT LOCATIONS WITH ALL OTHER DISCIPLINES PRIOR TO COMMENCING ANY WORK.

F. ALL EXTERIOR MOUNTED DEVICES SHALL BE PROVIDED WITH WP OR NEMA 3R RATING.

G. PROVIDE HUB TYPE FITTINGS ON EXTERIOR CONDUITS.

H. ALL EMPTY BOXES SHALL BE PROVIDED WITH BLANK WP STAINLESS STEEL COVER PLATES.

I. ALL ELECTRICAL CONSTRUCTION SHALL BE COORDINATED AND MAINTAIN WALL AND CEILING RATING INDICATED ON THE ARCHITECTURAL DOCUMENTS.

KEYED NOTES - ROOF ELECTRICAL (X)

1. CONNECT NEW EXHAUST FAN TO EXISTING EXHAUST FAN CIRCUIT IN RESTROOM. PROVIDE A NEW SWITCH IF ONE IS NOT ALREADY PROVIDED TO THE EXHAUST FAN. SEE MECHANICAL FOR EXACT CONTROL REQUIREMENTS.

2. UNIT COMES WITH UNPOWERED WP DUPLEX RECEPTACLE AND DUCT SMOKE DETECTORS MOUNTED ON THE EQUIPMENT. CONNECT TO EXISTING ROOF CIRCUIT THROUGH SUITABLE JUNCTION BOX LOCATION. PROVIDE MIN 1-INCH CONDUIT AND (2) #12 AWG AND GND. CONTRACTOR TO CONNECT SMOKE DETECTORS TO EXISTING FIRE ALARM SYSTEM.

3. STUB UP CONDUIT ON SIDE OF BUILDING. PAINT TO MATCH WALL

4. CONNECT NEW EXHAUST FAN AND TIME CLOCK TO EXISTING SPARE BREAKER IN JANITORS ROOM. PROVIDE 1-INCH CONDUIT WITH MIN (2) #12 AWG AND GND.

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SANTA ROSA, CA 95403

PROJECT TITLE

SONOMA VERTERAN'S MEMORIAL HALL HVAC TI

126 1ST STREET WEST
SONOMA, CA 95476

APPROVALS

#	REVISION	DATE
1	PERMIT BACKCHECK	05/21/2024

DRAWING TITLE

ELECTRICAL ROOF PLAN

ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	-
SCALE	AS NOTED
15000 INC. PROJECT No.	
CONSULTANT PROJECT No.	

DRAWING

E112

EXISTING MAIN SWITCHBOARD

EXISTING PANEL SCHEDULE

PANEL NAME: **(E) MSB** VOLTAGE: 208 NEMA RATING: 3R NOTES:
MAINS RATING: 800 (A) PHASE: 3 AIC RATING: 50K
BUS RATING: 800 (A) WIRE: 4 LOCATION:

CKT NO	PHASE WIRE	NEUT WIRE	USE	DESCRIPTION	BKR SIZE	BKR OPTS	BKR KVA	PHASE:	BKR KVA	BKR OPTS	BKR SIZE	DESCRIPTION	USE	NEUT WIRE	PHASE WIRE	CKT NO
1			H	(E) HVAC ROOF	250/3		24.02	A	38.43		400/3	(E) STAGE DIMMER	L			2
3			H				24.02	B	38.43				L			4
5			H				24.02	C	38.43				L			6
7								A								8
9								B								10
11								C								12
13			R	(E) PANEL B1	150/3		14.41	A	21.62		225/3	(E) PANEL E-1	R			14
15			R				14.41	B	21.62				R			16
17			R				14.41	C	21.62				R			18
19			R	(E) PANEL B	100/3		9.61	A	9.61		100/2	(E) PANEL A	H			20
21			R				9.61	B	9.61				H			22
23			R				9.61	C	9.61				H			24

LOADS:		USE LEGEND	LOAD TYPE	BREAKER OPTIONS:
PHASE A:	117.7 (KVA)	"H"	HVAC	GFCI - GROUND FAULT CIRCUIT INTERRUPTER
PHASE B:	117.7 (KVA)	"L"	LIGHTING	HACR - HEATING/AIR CONDITIONING RATED
PHASE C:	117.7 (KVA)	"M"	MOTOR	LO - LOCK-ON DEVICE
TOTAL:	353.1 (CONNECTED KVA)	"O"	OTHER	PA - PADLOCK ATTACHMENT
	980.7 (CONNECTED A)	"R"	RECEPTACLE	ST - SHUNT TRIP
		"P"	PANEL	HT - HANDLE TIE
		"C"	COOKING	FA - DEDICATED CIRCUIT FOR FIRE ALARM, RED HANDLE, MARKED
		"E"	EV LOADS	"FIRE ALARM CIRCUIT", LOCK-ON DEVICE. PERMANENTLY IDENTIFY
		"W"	WATER HEATER	CIRCUIT AT FIRE ALARM EQUIPMENT.

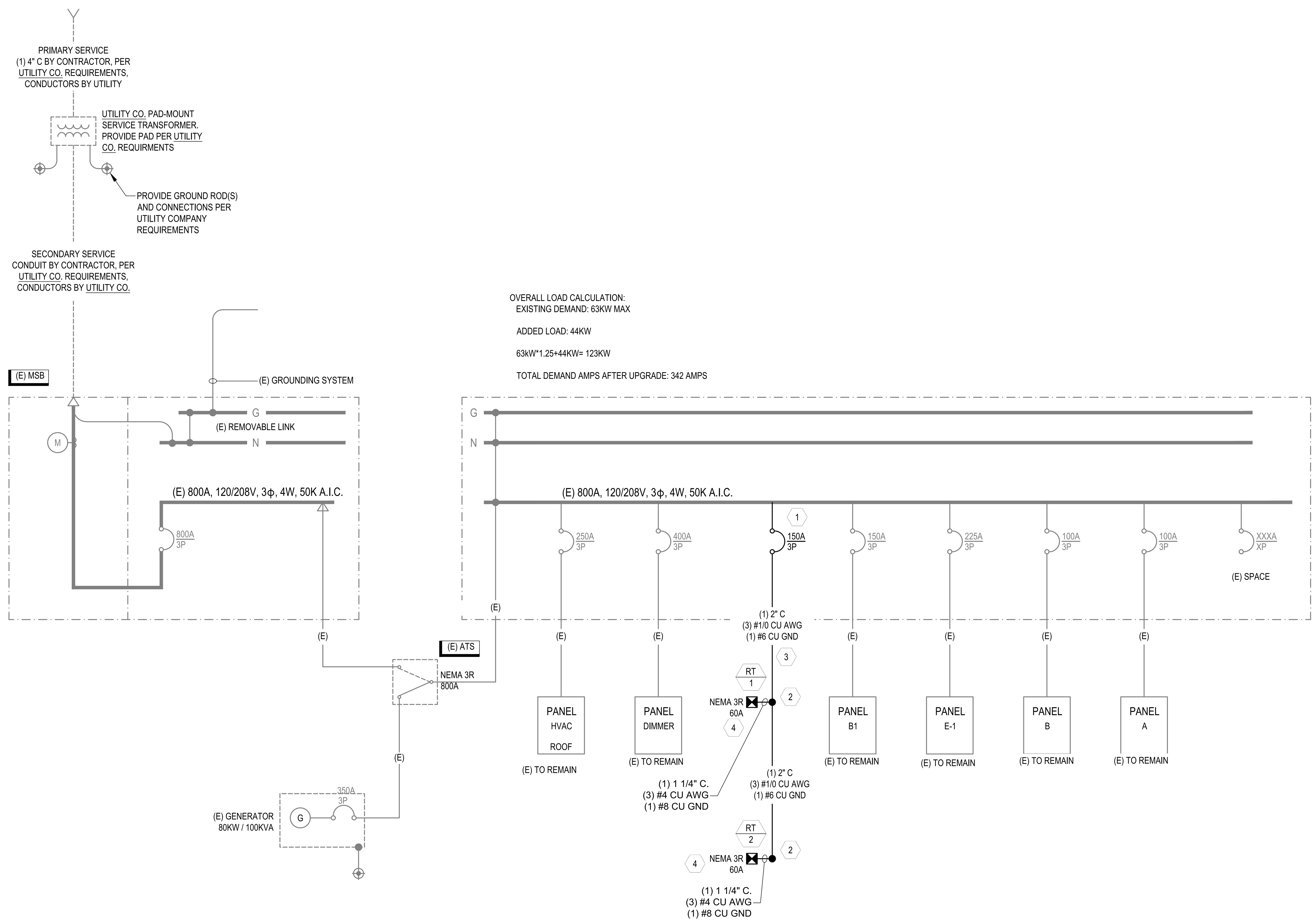
UPDATED MAIN SWITCHBOARD

UPDATED PANEL SCHEDULE

PANEL NAME: **(E) MSB** VOLTAGE: 208 NEMA RATING: 3R NOTES:
MAINS RATING: 800 (A) PHASE: 3 AIC RATING: 50K
BUS RATING: 800 (A) WIRE: 4 LOCATION:

CKT NO	PHASE WIRE	NEUT WIRE	USE	DESCRIPTION	BKR SIZE	BKR OPTS	BKR KVA	PHASE:	BKR KVA	BKR OPTS	BKR SIZE	DESCRIPTION	USE	NEUT WIRE	PHASE WIRE	CKT NO
1			H	(E) HVAC ROOF	250/3		24.02	A	38.43		400/3	(E) STAGE DIMMER	L			2
3			H				24.02	B	38.43				L			4
5			H				24.02	C	38.43				L			6
7	#1/0	-	H	RT-1, RT-2	150/3		14.59	A								8
9	#1/0		H				14.59	B								10
11	#1/0		H				14.59	C								12
13			R	(E) PANEL B1	150/3		14.41	A	21.62		225/3	(E) PANEL E-1	R			14
15			R				14.41	B	21.62				R			16
17			R				14.41	C	21.62				R			18
19			R	(E) PANEL B	100/3		9.61	A	9.61		100/2	(E) PANEL A	H			20
21			R				9.61	B	9.61				H			22
23			R				9.61	C	9.61				H			24

LOADS:		USE LEGEND	LOAD TYPE	BREAKER OPTIONS:
PHASE A:	132.3 (KVA)	"H"	HVAC	GFCI - GROUND FAULT CIRCUIT INTERRUPTER
PHASE B:	132.3 (KVA)	"L"	LIGHTING	HACR - HEATING/AIR CONDITIONING RATED
PHASE C:	132.3 (KVA)	"M"	MOTOR	LO - LOCK-ON DEVICE
TOTAL:	396.8 (CONNECTED KVA)	"O"	OTHER	PA - PADLOCK ATTACHMENT
	1102.3 (CONNECTED A)	"R"	RECEPTACLE	ST - SHUNT TRIP
		"P"	PANEL	HT - HANDLE TIE
		"C"	COOKING	FA - DEDICATED CIRCUIT FOR FIRE ALARM, RED HANDLE, MARKED
		"E"	EV LOADS	"FIRE ALARM CIRCUIT", LOCK-ON DEVICE. PERMANENTLY IDENTIFY
		"W"	WATER HEATER	CIRCUIT AT FIRE ALARM EQUIPMENT.



OVERALL LOAD CALCULATION:
EXISTING DEMAND: 63KW MAX

ADDED LOAD: 44KW

63kW*1.25+44KW= 123KW

TOTAL DEMAND AMPS AFTER UPGRADE: 342 AMPS

KEYED NOTES

1. PROVIDE NEW BREAKER IN EXISTING FRAME SPACE. BREAKER SHALL MATCH MANUFACTURER OF SWITCHBOARD/ OTHER BREAKERS. BREAKER SHALL COORDINATE WITH EXISTING MAIN BREAKER.
2. PROVIDE WEATHERPROOF J-BOX WITHIN 5FT OF EQUIPMENT. PROVIDE WEATHERPROOF TAP SPLICES IN BOX.
3. ROUTE CONDUIT UP TO ROOF. MOUNT CONDUIT ON PAINT TO MATCH WALL. VERIFY WITH OWNER ANY PAINTING REQUIREMENTS.
4. PROVIDE DEDICATED FUSED DISCONNECT AT AC UNIT. SEE MECHANICAL DRAWINGS FOR ADDITIONAL EQUIPMENT NOTES. UNITS SHALL HAVE THE CONTROL FUNCTION TO POWER DOWN WHEN THE ATS SWITCHES TO EMERGENCY POWER. PROVIDE CONTROL CONNECTION FROM THE ATS TO THE MECHANICAL CONTROLS.

1 SINGLE LINE DIAGRAM - POWER
NOT TO SCALE

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PROJECT TITLE
SONOMA VERTERAN'S MEMORIAL HALL HVAC TI

126 1ST STREET WEST
SONOMA, CA 95476

APPROVALS

#	REVISION	DATE
1	PERMIT BACKCHECK	05/21/2024

DRAWING TITLE
DIAGRAMS ELECTRICAL SITE

ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	-
SCALE	AS NOTED
15000 INC. PROJECT No.	
CONSULTANT PROJECT No.	

DRAWING
E601

A. DESIGN BASIS

A.1. EQUIPMENT SUPPORTS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE 2022 CBC THAT INCLUDES THE THE AMERICAN SOCIETY OF CIVIL ENGINEERS SEI/ASCE 7-16"MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES"

A.2. EQUIPMENT SUPPORTS DESIGNED FOR SEISMIC LOADS BASED ON THE FOLLOWING PARAMETERS:
BUILDING RISK CATEGORY =II-"STANDARD"
SITE CLASS = D (ASSUMED)
MAX. 0.2 SEC. SPECTRAL RESPONSE ACCELERATION, SS = 1.673
MAX. 1.0 SEC. SPECTRAL RESPONSE ACCELERATION, S1 = 0.629
IMPORTANCE FACTOR, Ie = 1.0
SEISMIC DESIGN CATEGORY = D
DESIGN SPECTRAL RESPONSE AT SHORT PERIODS; S_{DS} = 1.339

A.3. EQUIPMENT ANCHORAGE DESIGNED OF THE FOLLOWING LOADS:

RT-1 / RT-2
COMPONENT IMPORTANCE FACTOR; I_P = 1.0
A_P= 2.5
R_P= 6
H/Z= 1.0 S
F_p= 0.67 W_p
W_p= 900LB

EQUIPMENT IS NOT REQUIRED BY CODE TO BE OPERATIONAL AFTER AN EARTHQUAKE. SPECIAL SEISMIC CERTIFICATION OF EQUIPMENT IS NOT REQUIRED. HOWEVER,ALL EQUIPMENT SHALL BE SEISMIC CERTIFIED IF AVAILABLE.

A.4. SPECIAL INSPECTIONS AND TESTING: SEE S003

A.5. DESIGN LIVE LOADS:

ROOF LIVE LOAD = 20 PSF

B. GENERAL NOTES

B.1. ALL WORK TO CONFORM TO REQUIREMENTS OF ALL PUBLICATIONS AND NOTES LISTED UNDER "DESIGN BASIS".

B.2. ARCHITECTURAL DRAWINGS, MECHANICAL/ELECTRICAL/PLUMBING DRAWINGS AND ALL OTHER DRAWINGS AS REQUIRED SHALL BE USED IN CONJUNCTION WITH STRUCTURAL DRAWINGS TO DEVELOP DETAILS AND DIMENSIONS FOR SHOP DRAWINGS, FABRICATION, ERECTION AND CONSTRUCTION. CONTRACTOR IS TO COORDINATE EQUIPMENT, SUPPORT CONDITIONS AND DIMENSIONS FOR SUPPORTING BEAMS, FRAMES AND OPENINGS FOR MECHANICAL EQUIPMENT AND PROVIDE THIS INFORMATION FOR REVIEW.

B.3. DO NOT SCALE DRAWINGS.

B.4. CONTRACTOR SHALL NOTIFY THE CONTRACTING OFFICER/OWNER/ENGINEER IMMEDIATELY UPON DISCOVERY OF CONFLICTS IN THE DRAWINGS AND SPECIFICATIONS.

B.5. THE CONTRACTING OFFICER/OWNER/ENGINEER MAY PERIODICALLY VISIT THE SITE TO OBSERVE THE PROGRESS AND GENERAL QUALITY OF THE CONSTRUCTION. THESE VISITS ARE NOT INTENDED TO REPLACE THE CONTRACTOR'S RESPONSIBILITY FOR QUALITY CONTROL OR SPECIAL INSPECTION.

B.6. THE CONTRACTOR IS TO VERIFY ALL EXISTING CONDITIONS AND ALL DIMENSIONS IN FIELD PRIOR TO START OF CONSTRUCTION AND PROTECT AND MAINTAIN ALL EXISTING CONSTRUCTION AND ITS CONTENTS IN FULL.

B.7. THE STRUCTURE HAS BEEN DESIGNED TO BE STABLE AND SELF SUPPORTING AFTER THE CONSTRUCTION IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY FOR THE BUILDING'S STABILITY DURING CONSTRUCTION. THIS RESPONSIBILITY ALSO INCLUDES BUT IS NOT LIMITED TO METHOD AND SEQUENCE OF ERECTION, TEMPORARY SHORING AND TEMPORARY BRACING.

B.8. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO FOLLOW ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION.

B.9. SHOULD ANY INFORMATION ON THE STRUCTURAL DRAWINGS CONFLICT WITH THE SPECIFICATIONS OR ANY OTHER PART OF THE DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AND AN INTERPRETATION WILL BE GIVEN.

B.10. ALL SECTIONS, DETAILS, NOTES, DIMENSIONS AND CONDITIONS ARE APPLICABLE AT ANY OTHER LOCATION WHERE CONDITIONS AND DETAILS ARE SIMILAR BUT ARE NOT SPECIFICALLY NOTED AS SUCH OR ARE NOT SHOWN.

C. WOOD NOTES

C.1. ALL WORK TO CONFORM TO THE REQUIREMENTS OF THE "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION" (ANSI/NFOPA NDS-CURRNET EDITION) AS RECOMMENDED BY THE AMERICAN FOREST & PAPER ASSOCIATION.

C.2. THE STANDARD WOOD DETAILS AND THE NAILING, ETC., CALLED FOR IN THESE NOTES ARE MINIMUM REQUIREMENTS AND WILL APPLY TO ALL WORK EXCEPT WHERE MORE STRINGENT REQUIREMENTS ARE SHOWN ELSEWHERE. ALL WOOD CONSTRUCTION SHALL BE IN ACCORDANCE WITH CHAPTER 23 OF THE 2019 CBC.

C.3. FRAMING LUMBER SHALL BE DOUGLAS FIR AS FOLLOWS: ANY MEMBER WHICH FALLS BELOW GRADE OR HAS DEFECTS WHICH AFFECTS SERVICEABILITY SHALL BE REJECTED. ALL STRUCTURAL FRAMING SHALL BE SURFACED DRY WITH 19% OR LESS MOISTURE.
POSTS, HEADERS, AND STIFFENERS SHALL BE DF-L#1
STUDS SHALL BE DF-L#2
SILL SHALL BE AIWA UC2, NO. 2 PRESSURE TREATED DOUG FIR

C.4. PLYWOOD SHALL BE 5-PLY STRUCTURAL 1

C.5. LVL BEAMS SHALL BE GRADE 2.2E WITH A MINIMUM MODULUS OF ELASTICITY OF 2200 KSI, BENDING STRENGTH OF 2925 PSI, SHEAR STRENGTH OF 285 PSI. THEY SHALL BE THE SIZE SHOWN ON DRAWINGS AND HAVE NO CAMBER UNLESS NOTES ON DRAWINGS.

C.6. FOR CONVENIENCE FRAMING CONNECTIONS BY THE SIMPSON COMPANY, ARE CALLED OUT ON THE DRAWINGS. EQUIVALENT CONNECTIONS OF OTHER MANUFACTURERS HAVING THE SAME CAPACITY AND HAVING ICBO APPROVAL MAY BE USED. PROVIDE FULL NAILING OR BOLTING OF CONNECTIONS AS PUNCHED USING MANUFACTURER'S NAILS OR SPECIFIED BOLTS.

C.7. NAILS WILL BE COMMON WIRE TYPE UNO, GALVANIZED IN EXTERIOR LOCATIONS & AT PT SILL.

C.8. MINIMUM FRAMING NAILING REQUIRED SHALL BE PER 2022 CBC

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STRUCTURAL
STATE OF CALIFORNIA
DATE SIGNED: 05/06/2024

CLIENT
COUNTY OF SONOMA
23000 COUNTY CENTER DR., SUITE A220
SANTA ROSA, CA 95403

PROJECT TITLE
SONOMA VERTERAN'S MEMORIAL HALL HVAC TI

126 1ST STREET WEST
SONOMA, CA 95476

APPROVALS

#	REVISION	DATE
1	PERMIT BACKCHECK	05/21/2024

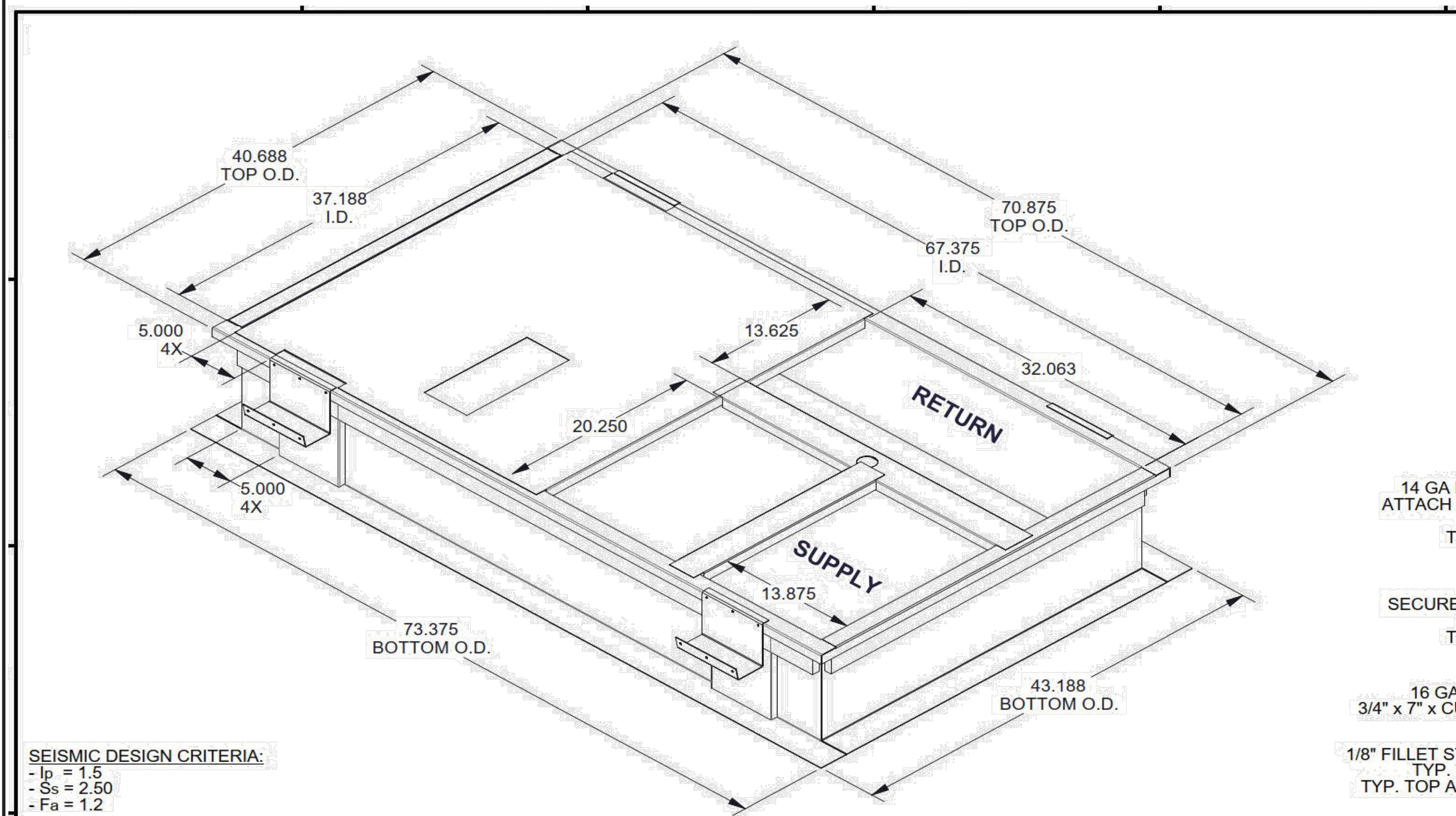
DRAWING TITLE
STRUCTURAL GENERAL NOTES

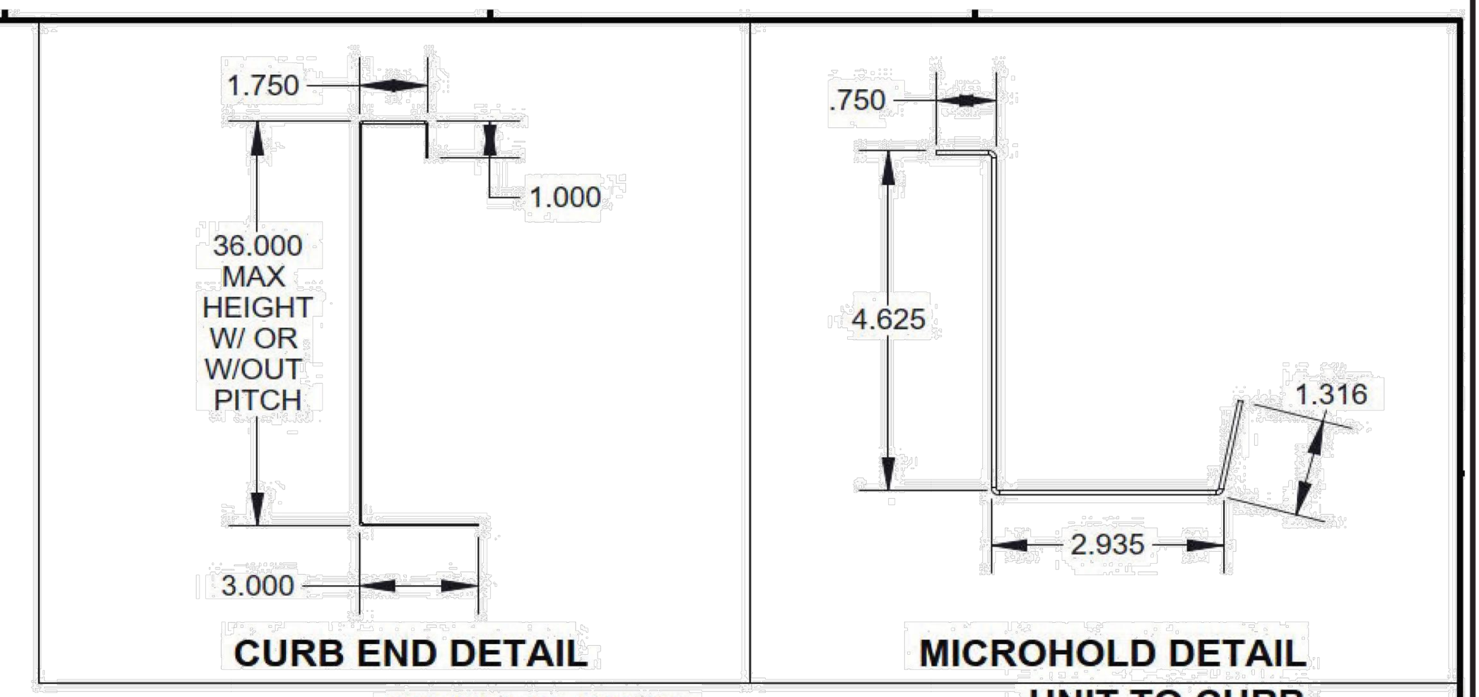
ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	-
SCALE	AS NOTED
15000 INC. PROJECT No.	
CONSULTANT PROJECT No.	

DRAWING
S001

MicroMetl	Date:	Weight: 105lbs (US) 47.63kg (Metric)	Part Number: CRBW-SRT12HA-1411
	RTU:		
Submitted to:		Approved by:	Notes:

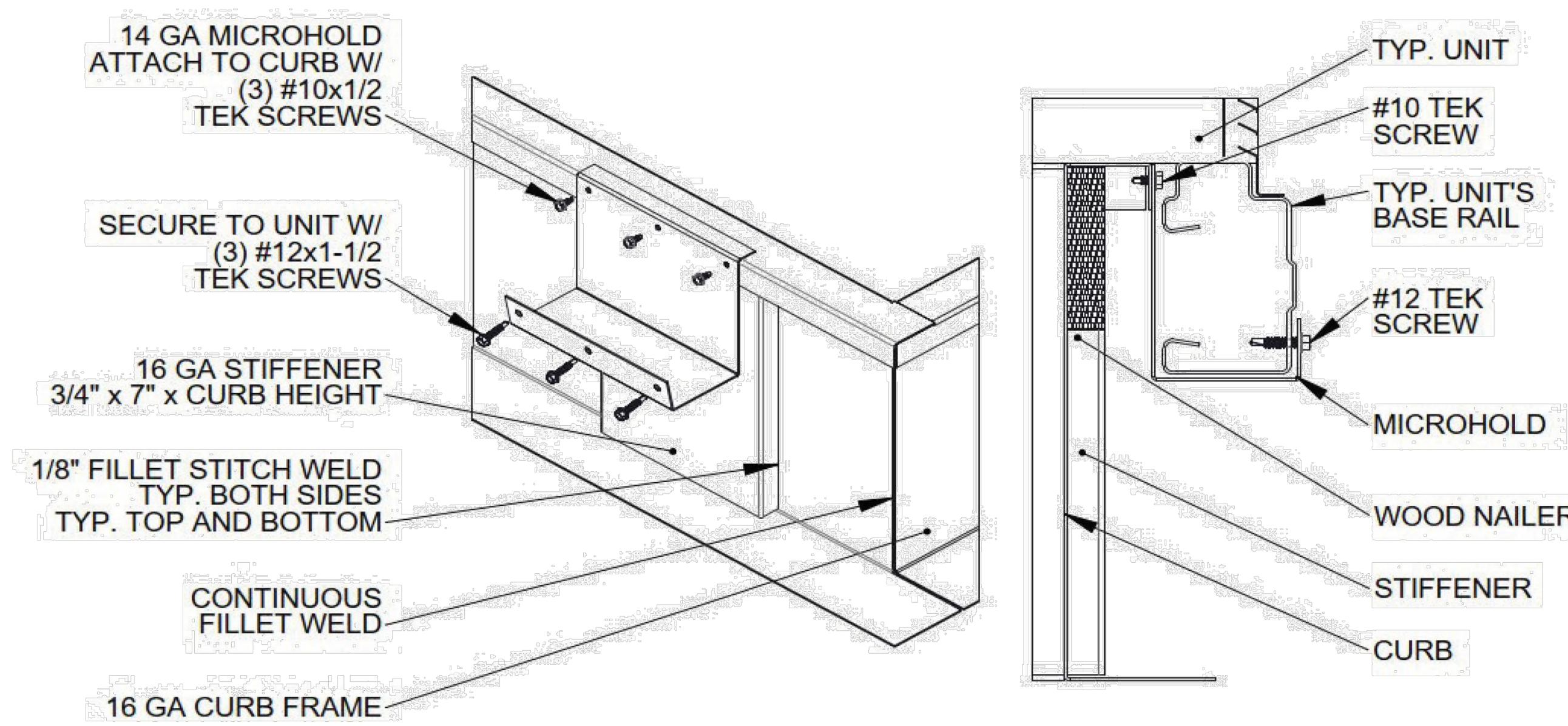
Welded Structurally Calculated Curb - 14 Inches Tall Non Insulated Full Perimeter Welded Structurally Calculated Curb Curb, California State Standard, Standard Seismic Criteria, "Structurally" Stamped By A Professional Engineer, Without Pitch, Insulated Deck Pan If Applicable, Includes Wood Nailer & Hold Down Brackets. Meets Seismic Requirements for 2022 CBC & 2021 IBC. Wind Design Criteria: 60 Foot Tall Building Maimum, Exposure C, 155 MPH - 3 Second Gust Speed, Risk Category III & IV.





WELDED CURB CORNER DETAIL

UNIT TO CURB ATTACHMENT DETAIL



14 GA MICROHOLD ATTACH TO CURB W/ (3) #10x1/2 TEK SCREWS
SECURE TO UNIT W/ (3) #12x1-1/2 TEK SCREWS
16 GA STIFFENER 3/4" x 7" x CURB HEIGHT
1/8" FILLET STITCH WELD TYP. BOTH SIDES TYP. TOP AND BOTTOM
CONTINUOUS FILLET WELD
16 GA CURB FRAME
TYP. UNIT
#10 TEK SCREW
TYP. UNIT'S BASE RAIL
#12 TEK SCREW
MICROHOLD
WOOD NAILER
STIFFENER
CURB

SEISMIC DESIGN CRITERIA:
- Ip = 1.5
- Ss = 2.50
- Fa = 1.2

WIND DESIGN CRITERIA:
- 60 FT. TALL BUILDING MAX.
- EXPOSURE C
- 155 MPH, 3-SECOND GUST WIND SPEED
- RISK CATEGORY III & IV

CURB STIFFENER REQUIREMENTS:
- STIFFENERS ARE REQUIRED ON ALL CURBS OVER 16" TALL
- (2) STIFFENERS, (2) MICROHOLDS PER LONG SIDE
- (0) STIFFENERS, (0) MICROHOLDS PER SHORT SIDE

THE STANDARD PRODUCT DOES NOT INCLUDE THROUGH THE SIDE SERVICE HOLES

MicroMetl Corporation

CRBW-SRT12HA-08 Series	08" TALL	84 LBS.
CRBW-SRT12HA-11 Series	11" TALL	95 LBS.
CRBW-SRT12HA-14 Series	14" TALL	105 LBS.
CRBW-SRT12HA-24 Series	24" TALL	153 LBS.
CRBW-SRT12HA-36 Series	36" TALL	202 LBS.

STRUCTURALLY CALCULATED WELDED CURB

MAX UNIT WEIGHT 1099 lbs.

ANCHORAGE DETAILS TO ROOF: ALL DETAILS ARE CALCULATED USING THE SEISMIC DESIGN CRITERIA INDICATED ABOVE. FOR ANY OTHER TYPE OF ANCHORAGE THE EOR HAS THE OPTION TO CALCULATE THE ANCHORAGE USING SITE SPECIFIC PARAMETERS AND LOADS.

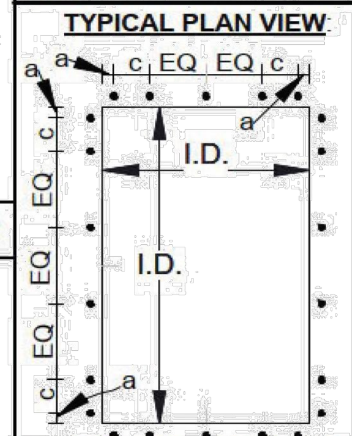
Indianapolis, IN. : (800) 662-4822
Sparks, NV. (800) 884-4662
Longview, TX. (903) 248-4800

DRAWN BY: IR | DATE 08/24/2022

MEETS SEISMIC REQUIREMENTS FOR 2022 CBC & 2021 IBC

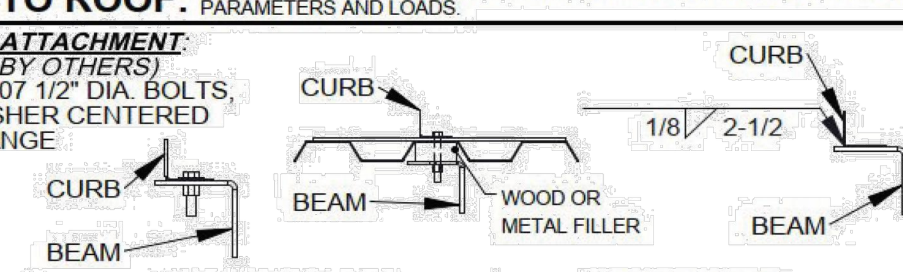
MEETS REQUIREMENTS FOR 155 MPH, 60' BUILDING HEIGHT MAX. 3 SEC. GUST, EXP C

TYPICAL PLAN VIEW:



c = SPACING @ CORNER ANCHORS

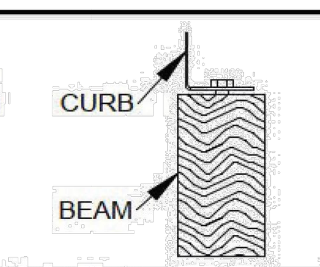
STEEL ATTACHMENT:
(BEAM BY OTHERS)
USE A307 1/2" DIA. BOLTS, W/ WASHER CENTERED ON FLANGE
a = 2"
c = 6"



CURB HEIGHT	QTY OF ANCHORS EA. LONG SIDE	EA. SHORT SIDE	EA. CORNER	TOTL
UP TO 14"	1	1	2	12
UP TO 24"	1	1	2	12
UP TO 36"	1	1	4	20

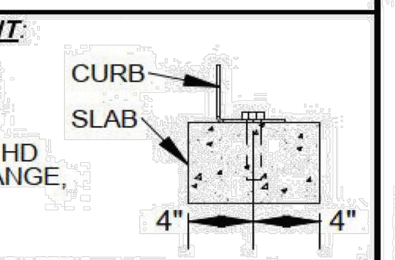
WELD OPTION: (2.5") LONG 1/8" FILLET WELDS ARE PERMITTED TO BE USED IN PLACE OF EACH BOLT INDICATED BY THE STEEL ATTACHMENT DETAIL, EQUALLY SPACED

WOOD ATTACHMENT:
(REF. DOUGLAS FIR)
USE 1/4" x 3" SIMPSON SDS W/ WASHER, CENTERED ON CURB FLANGE
a = 1"
c = 3"



CURB HEIGHT	QTY OF ANCHORS EA. LONG SIDE	EA. SHORT SIDE	EA. CORNER	TOTL
UP TO 14"	6	2	4	32
UP TO 24"	6	3	4	34
UP TO 36"	8	3	6	46

CONCRETE ATTACHMENT:
(3000 PSI MINIMUM, 6" MINIMUM THICKNESS) (4" MIN EDGE DISTANCE, 3-3/4" EMBEDDED)
USE 1/2" SIMPSON TITEN HD CENTERED ON CURB FLANGE, 8" MIN. SPACING
a = 3"
c = 8"



CURB HEIGHT	QTY OF ANCHORS EA. LONG SIDE	EA. SHORT SIDE	EA. CORNER	TOTL
UP TO 14"	1	1	2	12
UP TO 24"	1	1	2	12
UP TO 36"	2	1	2	14

BJG# 20220039

Master Revision 0001A

Page Revision 0001A

Indianapolis_3035 N. Shadeland Ave., Indianapolis, IN 46226_800.MMC.HVAC •• Sparks_905 Southern Way, Sparks, NV 89431_800.884.4MMC •• Longview_201 Kodak Blvd., Longview, TX 75602_903.248.4800

NOTE:
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NOTE:
BASIS OF DESIGN CURB SHOWN IS FOR A FLAT ROOF. EXISTING ROOF IS SLOPED. CONTRACTOR SHALL HAVE MANUFACTURER MODIFY CURB AS REQUIRED FOR EXISTING SLOPE. CONTRACTOR SHALL VERIFY SLOPE OF EXISTING ROOF PRIOR TO ORDERING. ROOF CURB SHALL BE CERTIFIED BY A CALIFORNIA PROFESSIONAL ENGINEER FOR PROJECT SPECIFIC CONDITIONS.

1 BASIS OF DESIGN MANUFACTURER SUPPLIED CERTIFED CURB

SCALE: 1/8" = 1'-0"

15000 INC.
heating, ventilation, air conditioning + plumbing design and engineering
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phone: 707.577.0363
fax: 707.577.0364

CONSULTANT
BrokawDesign
P.O. BOX 3103
ROHNERT PARK, CA 94927
www.brokawdesign.com

STAMP

DATE SIGNED: 05/06/2024

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COUNTY OF SONOMA
23000 COUNTY CENTER DR., SUITE A220
SANTA ROSA, CA 95403

PROJECT TITLE
SONOMA VERTERAN'S MEMORIAL HALL HVAC TI

126 1ST STREET WEST
SONOMA, CA 95476

APPROVALS

#	REVISION	DATE
1	PERMIT BACKCHECK	05/21/2024

DRAWING TITLE
CERTIFIED CURB INFORMATION

ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	-
SCALE	AS NOTED
15000 INC. PROJECT No.	
CONSULTANT PROJECT No.	

DRAWING
S002

permit SONOMA

County of Sonoma
Permit & Resource Management Department

STATEMENT OF SPECIAL INSPECTIONS — CNI-033

Name of Owner: County of Sonoma

Address: 126 1ST STREET WEST, SONOMA CA 95476

Permit Number: BLD23-2716

Job Description: SONOMA VETERAN'S MEMORIAL HALL HVAC TI

This Statement of Special Inspections is submitted to outline the requirements of 2019 CBC Chapter 17. Included are:

A. Schedule of special inspections and tests applicable to this project:

1. Special inspections, per Section 1704 & 1705;
2. Special inspection for seismic resistance, per Sections 1704.3.2, 1705.12, 1705.13;
3. Structural observations, per Section 1704.6;
4. Material testing and/or load testing, per Sections 1706 through 1709.

B. List of the special inspector, testing agencies, and registered design professionals that will be retained to conduct the applicable tests, observations, and testing required;

C. Contractor's statement of responsibility, per Section 1704.4.

Prepared By

Registered Design Professional in Responsible Charge: Tim Lengyel

License Number: S5196

Signature: TIM LENGYEL — Digitally signed by Timothy F. Lengyel, PE, SE Date: 2024.05.06 12:02:13-07'00'

Date: 12/14/2023

Owner's Authorization

Owner: Mark Abel

Signature: Mark Abel — Digitally signed by Mark Abel Date: 2024.05.06 11:49:57 -07'00'

Building Official Approval

Special inspections and testing, and structural observations, shall be performed in accordance with the approved plans and specifications, this statement, approved testing procedures, applicable listing information for fabricated items, and CBC Section 17.

The Schedule of Special Inspections summarizes the special inspections and tests required. Special inspectors shall refer to the approved plans and specifications for detailed special inspection requirements. Any additional tests or observations required by the approved plans, specifications, or required by the building official shall also be performed.

Interim reports will be submitted to the building official and the registered design professional in responsible charge, in accordance with CBC Section 1704.2.4.

At the conclusion of work included in the permit, a report of special inspections and structural observations shall be submitted to the building inspector. The final report shall document:

A. Required special inspections;

B. Final results of structural testing;

C. Correction of discrepancies noted in inspections;

D. Written statement of structural observations, and identification of any reported deficiencies which, to the best of the structural observer's knowledge, have not been resolved.

This plan has been developed with the understanding that the building official shall:

A. Review and approve the qualifications of special inspectors who shall perform inspections;

B. Review submitted inspection reports;

C. Perform inspections as required by the locally adopted building codes.

Schedule of Inspections, Testing Agencies, and Inspectors

The following are the testing agencies, registered design professionals, and special inspectors that will be retained to conduct tests, inspections, and structural observations for this project:

	Responsibility	Firm	Address, telephone, e-mail
1.	Special Inspection (except for geotechnical)	n/a	
2.	Material Testing	n/a	
3.	Geotechnical Inspections	n/a	
4.	Structural Observations	TBD	

Special inspections can be performed by agencies approved by Permit Sonoma listed on CNI-014 Special Inspection Agency Recognition List. Special inspections may also be performed by the engineer of record where the engineer has submitted the appropriate certification during the plan check process (e.g. Structural Welding Special Inspector, Reinforced Concrete Special Inspector, etc.).

Seismic Requirements (Section 1704.3.2)

Identify the designated seismic systems and seismic-force-resisting systems subject to special inspections per CBC Section 1705.12. Identify any required testing and qualification for seismic resistance per CBC Section 1705.13.

The project consists of a replacement of two roof top units. The units require structural strengthening of the framing.

Summary of required special inspections, structural testing, and structural observations

Briefly describe required special inspections and structural observations for this project. Full schedule of inspections are those that are checked off on the following pages. Include additional sheets as necessary to identify frequency and extent of structural observations.

Special Inspections

Not Required

Structural Observations

STRUCTURAL OBSERVATION OF ROOF FRAMING IS REQUIRED. STRUCTURAL OBSERVATION SHALL CONSISTS OF A MINIMUM OF THREE VISITS:
1. FIRST VISIT SHALL BE WHEN ROOF IS OPENED BUT BEFORE FRAMING IS INSTALLED TO VERIFY EXISTING CONDITIONS.
2. A SECOND VISIT SHALL OCCUR ONCE FRAMING IS IN PLACE, BUT BEFORE THE SHEATHING IS REINSTALLED.
3. A THIRD VISIT IS REQUIRED WHEN THE SHEATHING IS REINSTALLED BUT BEFORE ROOFING IS REPLACED.

Schedule of Special Inspections

Column headers:

C = Full-time observation of work by an approved special inspector while the work is being performed.
P = Intermittent observation of work by an approved special inspector where the work has been performed and at the completion of work.

Box Entries:

X = Denotes either "C" continuous or "P" periodic inspections, according to column placement.
-- = Denotes that an activity is either a one-time activity or its frequency is defined in some other manner.

Notes/Referenced Standards: Indicates the referenced standard applicable to the criteria, method, and frequency of the special inspection or testing required. Additional notes may be included in this box denoting frequency of inspections or the special inspection agency responsible for the particular inspection item.

Additional details regarding inspections and tests are provided in the project specifications or notes on the drawings.

VERIFICATION AND INSPECTION

1704.6 – Structural Observations	C	P	Check if Required	Notes/Referenced Standards
Prior to the commencement of observations, the structural observer shall submit to the building official a written statement identifying the frequency and extent of structural observations	--	--	☑	Only Required if Structural Observer Proposed Less observations then listed in this document.
At the conclusion of work included in the permit, the structural observer shall submit to the building official a written statement that the site visits have been made and identify any reported deficiencies which have not been resolved	--	--	☑	
Structural observations for structures	--	--	☐	CBC 1704.6.1
Structural observations for seismic resistance	--	--	☐	CBC 1704.6.2

CONTRACTOR RESPONSIBILITY

Per Section 1704.4, each contractor responsible for the construction of a main seismic-force-resisting system, designated seismic system or a seismic-resisting component listed in the Statement of Special Inspections shall submit a written statement of responsibility to the building official and the owner **prior to the commencement of work** on the system or component. The contractor's statement of responsibility shall contain acknowledgment of awareness of the special requirements contained in the Statement of Special Inspections.

Each contractor responsible for the construction of the applicable system or component as specified above shall use the following lines to enter their name, signature, company, license number, date, and particular system or component that they are taking responsibility for prior to commencement of work on the indicated system or component. A copy of this page shall be presented to the building official, and it is the contractor's responsibility to provide the owner a copy of this document.

Name _____

Signature _____

Company _____

License Number _____ Date _____

15000 INC.
heating, ventilation, air conditioning + plumbing design and engineering
6085 STATE FARM DR. #130 phone: 707.577.0363
ROHNERT PARK, CA 94928 fax: 707.577.0364

CONSULTANT
BrokawDesign
P.O. BOX 3103
ROHNERT PARK, CA 94927
www.brokawdesign.com

STAMP
REGISTERED PROFESSIONAL ENGINEER — TIMOTHY FRANCIS LENGYEL — No. S5196 Exp. 9/30/25 — STRUCTURAL — STATE OF CALIFORNIA
DATE SIGNED: 05/06/2024

CLIENT
COUNTY OF SONOMA
23000 COUNTY CENTER DR., SUITE A220
SANTA ROSA, CA 95403

PROJECT TITLE
SONOMA VETERAN'S MEMORIAL HALL HVAC TI

126 1ST STREET WEST
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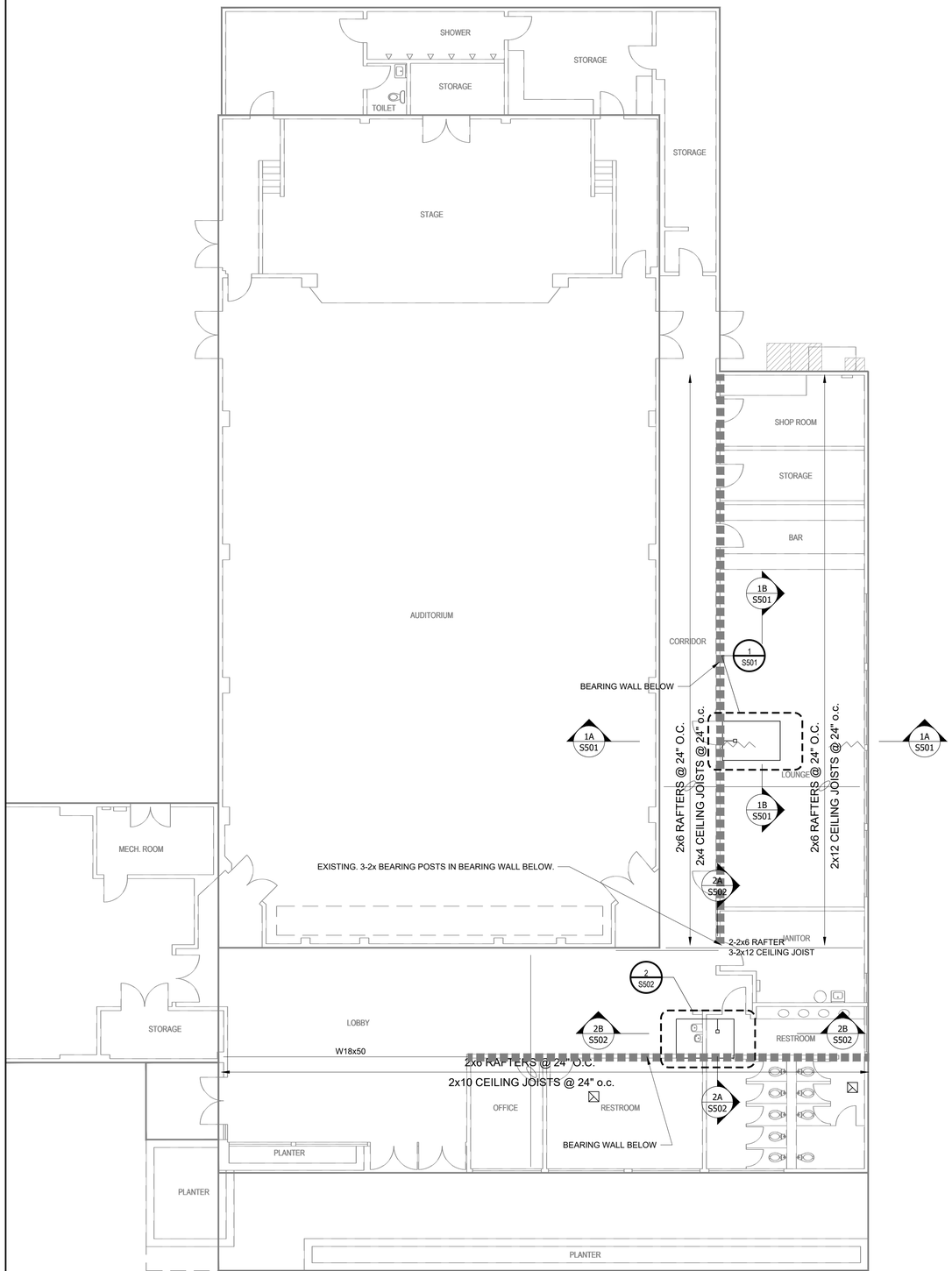
APPROVALS

#	REVISION	DATE
1	PERMIT BACKCHECK	05/21/2024

DRAWING TITLE
STATEMENT OF SPECIAL INSPECTIONS

ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	-
SCALE	AS NOTED
15000 INC. PROJECT No.	
CONSULTANT PROJECT No.	

DRAWING
S003



1 PARTIAL ROOF PLAN

SCALE: 1/8" = 1'-0"

0 8' 16' 32'

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Exp. 9/30/25
STRUCTURAL
STATE OF CALIFORNIA

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126 1ST STREET WEST
SONOMA, CA 95476

APPROVALS

#	REVISION	DATE
1	PERMIT BACKCHECK	05/21/2024

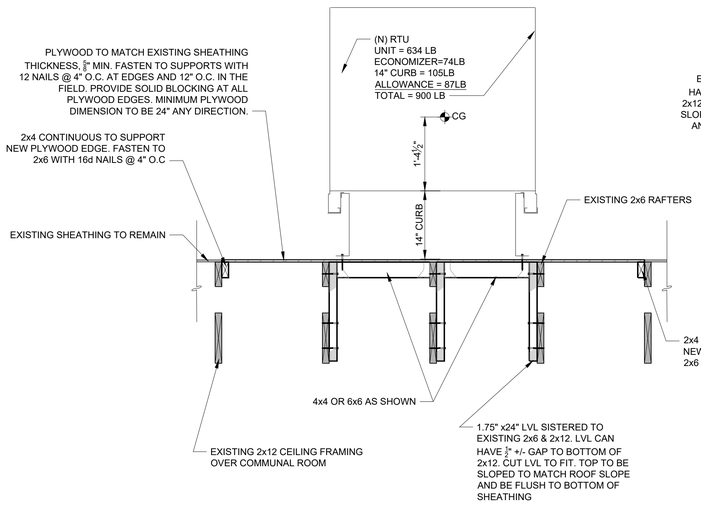
DRAWING TITLE

PARTIAL ROOF PLAN

ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	-
SCALE	AS NOTED
15000 INC. PROJECT No.	
CONSULTANT PROJECT No.	

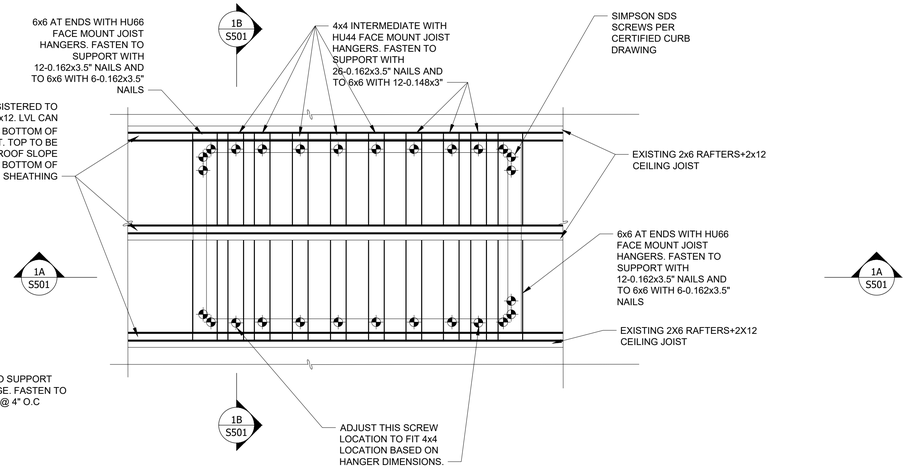
DRAWING

S101



1B TRASVERSE SECTION AT RT-1

SCALE: 3/4" = 1'-0"



1C PARTIAL PLAN AT RT-1

SCALE: 3/4" = 1'-0"

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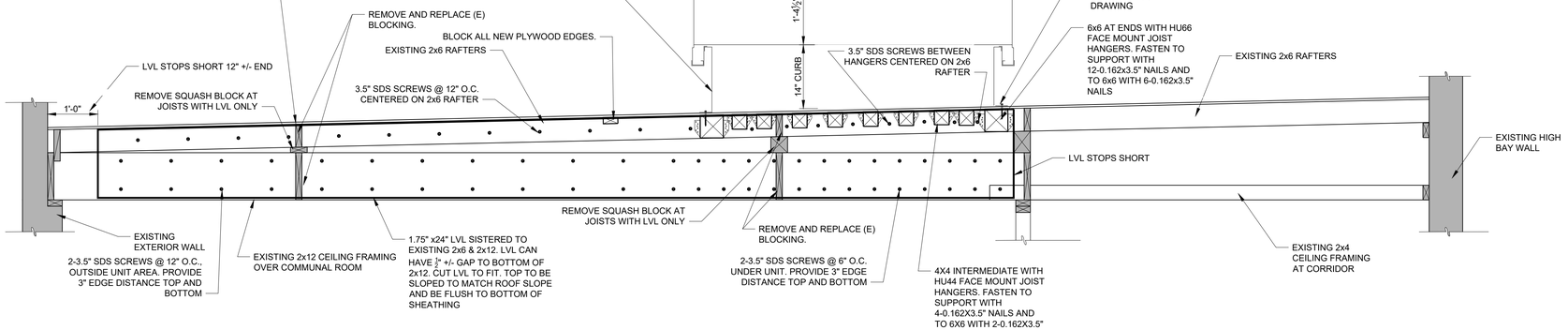

1A LONGITUDINAL SECTION AT RT-1

SCALE: 3/4" = 1'-0"

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1 SUPPORT DETAIL AT RT-1

SCALE: 3/4" = 1'-0"

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DRAWING TITLE
RT-1 SUPPORT DETAILS

ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	
SCALE	AS NOTED
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CONSULTANT PROJECT No.	

DRAWING
S501

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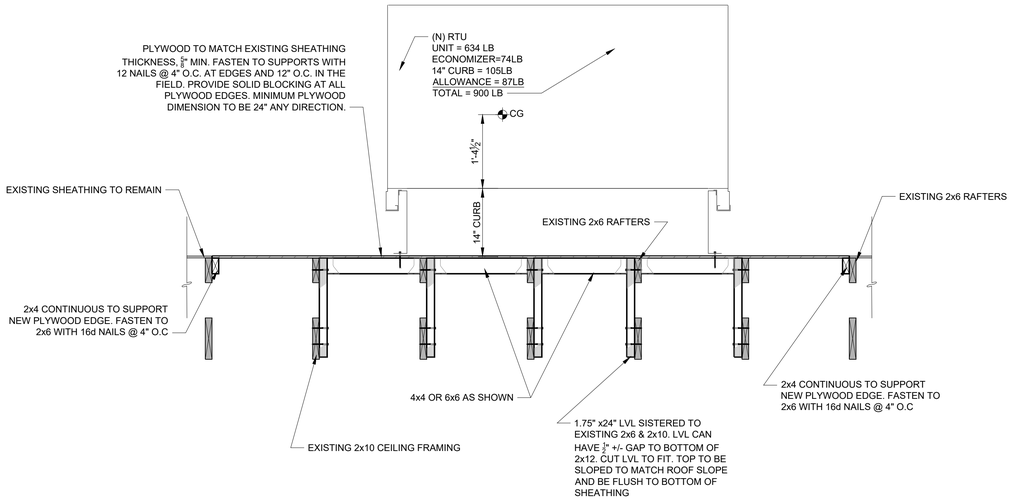
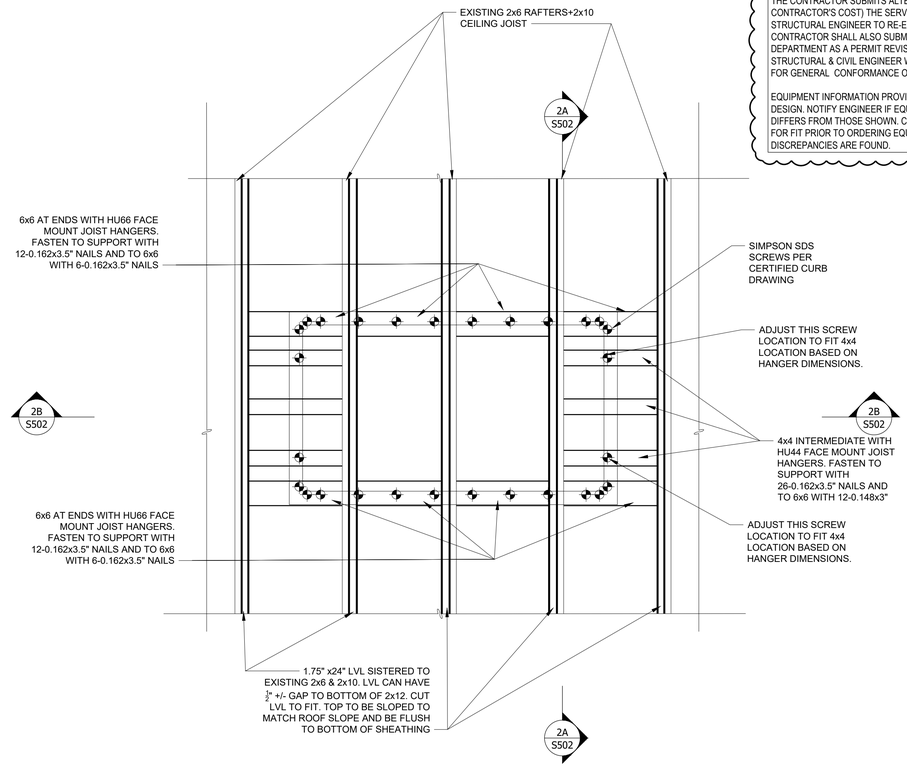


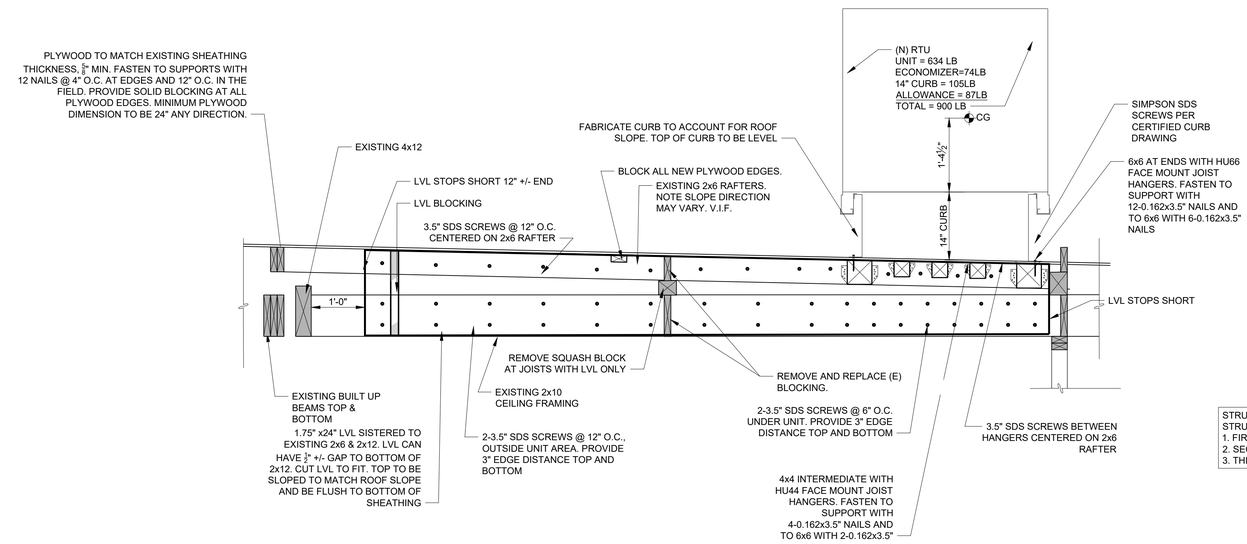
2B LONGITUDINAL SECTION AT RT-2

SCALE: 3/4" = 1'-0"



2C PARTIAL PLAN AT RT-2

SCALE: 3/4" = 1'-0"



2A TRANSVERSE SECTION AT RT-2

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2 SUPPORT DETAIL AT RT-2

SCALE: 3/4" = 1'-0"

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STAMP
REGISTERED PROFESSIONAL ENGINEER TIMOTHY FRANCIS LENTZ No. S5196 Exp. 9/30/25 STRUCTURAL STATE OF CALIFORNIA
DATE SIGNED: 05/06/2024

CLIENT
COUNTY OF SONOMA
23000 COUNTY CENTER DR., SUITE A220
SANTA ROSA, CA 95403

PROJECT TITLE
SONOMA VERTERAN'S MEMORIAL HALL HVAC TI

126 1ST STREET WEST
SONOMA, CA 95476

APPROVALS

#	REVISION	DATE
1	PERMIT BACKCHECK	05/21/2024

DRAWING TITLE
RT-2 SUPPORT DETAILS

ISSUE DATE	12/14/2023
ISSUE TYPE	PERMIT
DRAWN BY	TFL
CHECKED BY	-
SCALE	AS NOTED
15000 INC. PROJECT No.	
CONSULTANT PROJECT No.	

DRAWING
S502

Date Stamped: 7/9/2024 Permit #: BLD23-7808 Plans Examiner: Paul Marquez
REVIEWED FOR CODE COMPLIANCE - PERMIT SONOMA